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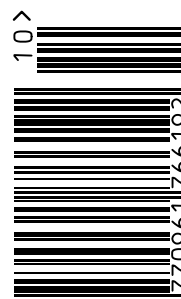


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Rafael Todes, Mark Osborn



These days all loudspeakers have a port, even if its hidden somewhere, like in the base of the cabinet. This 'hole in the cabinet' is a peculiar little thing. I suspect few loudspeaker designers really know how it works even now, and in the early days of ports they certainly did not. As a result they have never worked too well and many still do not, bouncing like the acoustic equivalent of a rubber ball. As a result there's complaint about "reflex bass" – many listeners object to it. There are very sound reasons for this, if you'll pardon the pun, so Peter Comeau – who has

written many learned articles about loudspeaker design for Hi-Fi World – has made an alternative loudspeaker cone loading system available in the new Castle Avon 5 I review on p10 of this issue. I know just where he was coming from with this design and it works a treat in real life rooms. The Avon 5 hasn't got bouncy bass. This not only improves bass quality from the loudspeaker but also reduces room boom – you gain twice.

We were all wowed by the McIntosh MC152 power amplifier. How a product can step ahead in its sound so blatantly is almost a mystery. I am used to different sounds but I am not used to being perplexed by the enormity of difference. You might think that the MC152, with transistors driving output transformers, may sound "valve like". Not a bit of it. It is hard and fast but has enormous bass grip and drive, plus fabulous midrange insight. I'd call treble "obvious"! But at the same time this amplifier transformed every loudspeaker attached to it. Read Jon Myles review on p16.

Turntables and digital are surely separated by a deep and uncrossable chasm. Or perhaps not. Pro-Ject have erected a bridge across it with impressive skill - see our review on p82. A turntable with a digital output? No, surely not!

And finally Martin Pipe spent time quizzing the BBC about recording The Proms and they were only too happy to tell him all. Martin is a techie but I think you'll be happy to read the facts. And how many mics did they use? Phew!

I do hope you enjoy this issue as much as we enjoyed putting it all together.

Noel Keywood
Editor

p.s. For many months now we have been trying to weedle out of Tannoy a pair of Westminster Royal GR horn loudspeakers, a three-man-plus-Arnie lift that no magazine has ever managed. They have agreed and a delivery date has been arranged. I just have to phone Arnie. Keep reading!



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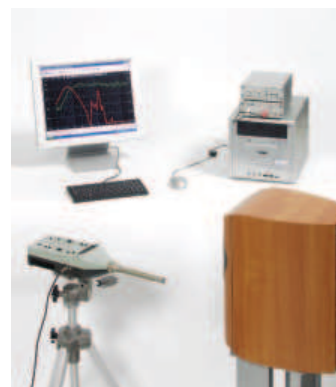
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To ensure the upmost accuracy in our product reviews, *Hi-Fi World* has extremely comprehensive in-house test facilities, and our test equipment - from big names like Rohde & Schwarz and Hewlett Packard - is amongst the most advanced in the world.

Loudspeakers are measured using a calibrated Bruel & Kjaer microphone feeding a Clio-based computer

analyser, using pulsed and gated sinewaves, in a large room to eliminate the room's influence. Pickup arm vibration is measured with a Bruel & Kjaer accelerometer.

No other UK hi-fi magazine has in-house testing, and none has access to such advanced tests across all types of equipment. That's why you can depend on *Hi-Fi World* reviews.

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Audio Cable Award Grand Slam

Products of the Year 2014:

Black Diamond Speaker Cable

Black Diamond USB

Blue USB

Black Power Cable

Black Diamond RCA

Black Diamond XLR



"But perhaps their reticence is understandable when the product sounds as good as this – after all, why let others in on the secret? Used in a variety of systems the Black Diamonds consistently revealed a wider perceived bandwidth, bigger soundstage and the ability to present transient details in an effortless fashion"

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QUAD S SERIES

Quad's new loudspeaker range, the S Series, combines Kevlar-coned bass/midrange drivers with a specially designed ribbon tweeter. The range comprises two standmount models (S-1 and S-2), two floorstanders (S-4 and S-5) and a centre speaker for home cinema systems (S-C). At 285mm high, the S-1 incorporates a 100mm bass/mid cone while the larger S-2 uses a 125mm bass/mid cone. The two floorstanders sport three-way configurations, coupling a 100mm midrange driver with two 125mm bass drivers in the S-4 and a 125mm midrange driver with two 165mm bass drivers in the S-5. The S-C is a two-way design, incorporating a pair of 100mm bass/mid drivers.

All S Series models feature a bespoke ribbon treble unit. The new ribbon unit developed for the S Series is a sandwich construction. This ribbon tweeter is aligned with Quad's Kevlar-coned bass and midrange drivers through new crossover networks. While the standmount models use rear-firing reflex ports to augment the bass, the floorstanders incorporate three ABRs (Auxiliary Bass Radiators) in place of a port. These passive, rear-firing bass units support the main drivers to extend bass response down to 35Hz.

With rounded top edges at the front and rear, each speaker cabinet uses a sandwich construction of alternate layers of MDF and high-density particle board.

Finishes include a choice of black or mahogany wood veneers. These will be joined in the autumn by hand-lacquered piano white and piano black finish options. Prices are: S-1, £599.95 per pair; S-2, £799.95 per pair; S-4, £1299.95 per pair; S-5, £1599.95 per pair and S-C, £499.95 each.

Call 01480 447700 or log on to www.quad-hifi.co.uk for more information.



KEF EGG

KEF has announced the launch of the EGG Wireless Digital Music System.

KEF EGG is Bluetooth enabled, with 4.0 aptX compatibility for those with suitable devices. KEF's Uni-Q driver array is featured here in its latest form.

The KEF EGG is a complete 'plug-and-play' package with built-in amplification and DAC. The system is also supports 24bit/96kHz USB input.

The speakers include the 'tangerine' waveguide that helps sound radiate spherically. In addition, KEF's Z-flex cone surround guides the sound from the tweeter across the surround. The midrange cone is made from aluminium.

A subwoofer input is included, allowing you to add a KEF subwoofer for more bass extension. There is a choice of three finishes: gloss black, pure white and frosted blue. Price is £349.95

For more details click on www.kef.com.



THE ROKSAN ROAR

After a quiet period, Roksan is back with a cluster of new products.

First up is the K3 CD Di, a combination CD Player and DAC. The CD section of the CD Di is based on the K3 CD (which will remain in the range as a standalone CD player).

The DAC section of the CD Di features both optical and coaxial digital inputs that are capable of handling data streams up to 24bit/192kHz. Price is £1,300.

The company is also launching a new tonearm, The Pug, based around a large, light and rigid, 22mm diameter carbon fibre arm tube; while most other parts feature black chromed anodised aluminium. The large counterweight area at the rear of the arm employs a solid, fixed section in combination with two adjustable counterweights. Anti-skate is managed by a traditional 'weight & thread' mechanism at the front of the counterweight area. Price is £1,375.

The company has also completely revamped its range of Caspian phono electronics. Consisting of the RPP phono stage, the RPM speed control and two Vinyl System Control solutions – the VSC and VSC S2 – all the new models use the same housing as the Caspian M2 Series electronics. The RPP is Roksan's new reference phono stage boasting MM and MC compatibility, with switchable gain and impedance settings. Price is £1,900.

The RPM is a flagship power supply/speed control solution for the Xerxes 20+ turntable. Based around a digital speed control PCB, the RPM can also have its speed adjusted by up to 6.25% either way, to compensate for poor mains supply. Price is £1,450. The Vinyl System Control (VSC) combines the new RPM speed controller and RPP phono stage into one Caspian M chassis. Price is £3,000 (VSC)/£3,250 (VSC S2). More information on 01235 511166 or www.henleydesigns.co.uk.



ATLAS ASCENT ULTRA

Atlas has announced that its new updated Ascent Ultra interconnect cable and Ascent XLR are now available.

Made of a single solid core surrounded by sixty-four interwoven strands of Ohno Continuous Cast (OCC) grain-free copper, Atlas also uses Fluorinated Ethylene Propylene (FEP), which is extruded around the bare OCC copper conductors in a thermally stable manner. This process allows the required geometry of the conductor within the dielectric to be maintained.

The all-new Ascent Ultra plug has a 57% reduction in mass over its predecessor and employs an internal non-conductive sleeve closely matched to the dielectric properties of the cable. As with all Atlas plugs, the Ultra plug maintains a solder free construction, self-cleaning insertion and material consistency. Prices include £575 for 1m pair.

Call 01563 572666 or click on www.atlascables.com for more information.



VENERE S

The new Venere S (Signature) is the latest Sonus faber loudspeaker and the new flagship of the Venere collection featuring three 180mm woofers. Entirely designed and assembled by hand in Arcugnano (Italy), this floorstanding three-way speaker, unlike its Venere siblings, features a new design for the reflex port. Instead of being positioned on the front baffle it is fitted in the lower part of the cabinet, directly facing the floor.

The baskets of the Venere S drivers are custom made for Sonus faber in diecast metal with "Ultra Free Compression" design to minimise the acoustic interference generated by the moving parts of the transducers.

The three woofer cones of Venere S are made of aluminium, while the midrange features a Curv membrane, a special thermoformed polypropylene fibre. The high frequencies are reproduced by a tweeter with a soft dome membrane made of silk. For more information go to www.sonusfaber.com.

MINISTRY OF SOUND AUDIO S PLUS

The Audio S Plus Bluetooth speaker is a compact, wireless speaker with a splash-proof design, with a wireless range of up to 10m and playback of up to fifteen hours.

It features NFC pairing and a speakerphone function, while it also remembers the last seven devices it was paired with. You can also use two Audio S Plus units and pair them for stereo. The Audio S Plus can be used in conjunction with the Ministry Audio app (available on iOS and Android), which offers switching between Spotify streaming, internet radio, Ministry's radio service or streaming from a local DLNA server. Price is £130. For more details click www.ministryofsound.com.



THE TAPE PROJECT

Reel-to-reel outfit The Tape Project has announced two new editions to its library. Jacqui Naylor's album, 'The Number White' was recorded entirely on to 2-inch 16-track analogue tape, then the title was mixed to 1-inch two-track tape. The finished album was then duplicated in real time on 1/4-inch tape at the Tape Project's Tape Shed.

Next? Jerry Garcia and David Grisman. In the 1980's Jerry Garcia started hanging out over at David Grisman's house to play together just for fun, sharing the music they both loved. Grisman had a studio in his home and both men would jam in the studio with the tape rolling. They did this informal recording over a period of several years and eventually Garcia suggested Grisman release the recordings on David's Acoustic Disc label. This is the first selection that David has pulled from that extensive library. For more information go to www.tapeproject.com.



ROTH SOUNDBAR

Roth AV has announced the BAR 2LX. Retailing at £149, the soundbar and wireless subwoofer audio system offers aptX-ready Bluetooth technology. The cloth grille-finished soundbar houses four full-range speaker drivers plus a total power of 120W. For more information call 01753 682782 or click on www.rothaudio.co.uk.

CHORD SARUM SUPER ARAY INTERCONNECT

The Chord Company has launched the Sarum Super ARAY, part of The Chord Company's new flagship Sarum Super ARAY range.

The new RCA interconnect cable uses micro-polished silver-plated conductors, with a gas-foamed PTFE dielectric and high-density foil and braid combination shielding. Key improvements include the proprietary Super ARAY technology and a new PTFE plug surround.

Existing owners of Sarum Tuned ARAY or Sarum cables, can return them to The Chord Company for an upgrade to the new Sarum Super ARAY specification. The cables are completely disassembled and then re-built. Signal pins and earth shrouds are examined and replaced if necessary and the new Super ARAY conductors are fitted. The cable is then re-built with the new PTFE plug surrounds.

Owners should contact their nearest Chord Company Sarum retailer for more information in the first instance but further details are available on The Chord Company's website

The Sarum Super ARAY RCA, XLR and DIN interconnects are available in standard 1 metre lengths. Custom lengths can be made to order.

Prices are: Sarum Super ARAY interconnect 1m RCA £1,900; additional metres £850. Upgrading a Tuned ARAY RCA to Super ARAY specification £550

Call 01980 625700 or click on www.chord.co.uk for more information.



LEEMA XEN 2

Following a seven-year absence, Leema Acoustics' five-litre micro monitor is back as the Xen 2 loudspeaker: the original Xen having been the result of a research project to squeeze a BBC-graded monitor speaker into a small cabinet.

The new Xen 2 is based on the previous model (deleted in 2008) but with improvements for 2015.

The Xen 2's cabinet construction is made from folded and welded steel, 1.5mm thick, lined with a bitumastic layer and the cavity is then stuffed with real sheep's wool.

The back panel is steel with bitumen on the inside and the crossover board is attached to the terminals directly. The original Xen had SEAS drivers but, following their discontinuation, Leema Acoustics' engineering team commissioned a mid/bass drive unit to be built to its own specification. The tweeter is a soft-dome unit with a neodymium magnet and Ferro-fluid-loaded coil. Price is £1,295. For more information, call 01938 559021 or click on www.leema-acoustics.com.

CANTATA

Black Rhodium has announced its new Cantata interconnect – made from conductor wires of cryogenically processed pure palladium and treated with DCT++Deep Cryogenic Treatment. This involves temperature processing above and below room temperature. The DCT++ process alters the molecular structure of the cable to improve uniformity.

The silver wires in Cantata are insulated in PTFE with a layer of air separating the wire from the inner wall of the insulation along its length. Cantata is fitted with two Graham Nalty Legacy Range VS-2 Vibration Stabilisers. The cable is also covered in a braided screen to protect the inner cores from picking up radio frequency interference (RFI) by twisting the cores.

The screen is connected at one end only to prevent 'loop aerials' between equipment picking up noise. Another addition are two separate cores for positive and negative signal flows. These are connected in opposite directions from the way they were wound on the reel.

Cantata is terminated with Rhodium Plated plugs. The RCA version is terminated with Graham Nalty Legacy Range GN-4 RCA connectors. Rhodium plating is applied to the plugs.

Prices include 1m pair stereo terminated with Rhodium-plated RCA connectors £4000; 1m digital terminated with Rhodium-plated XLR connectors, £2100; 1m pair stereo terminated with Rhodium-plated XLR connectors, £4000; 1m digital terminated with Rhodium-plated XLR connectors, £2100;

For more information either call 01332 342233 or log on to www.blackrhodium.co.uk.



MONITOR AUDIO AIRSTREAM S150

This multi-zone, Bluetooth 4.0 speaker, featuring aptX, is constructed from a mineral-filled polymer and holds four drivers, comprising a proprietary gold dome C-CAM tweeter flanked on angled baffles by dual 76mm-CAM metal cone bass drivers and augmented by a rear-firing Auxiliary Bass Radiator (ABR). The C-CAM drivers are powered directly by class-D amplifiers, generating 40W in total, fed by a DAC and optimised by digital processing. iOS devices may be charged via the USB input and analogue devices can connect through a 3.5mm stereo jack. Finished in a choice of white or black finishes, the unit can be shelf, table-top or wall mounted. Price is £150.

For more information see www.monitoraudio.co.uk.



Ace Of Bass!

Transmission line loading and ribbon tweeters make the new Castle Avon 5s a true wide bandwidth loudspeaker, finds Noel Keywood.

If you've ever dreamt about a big floorstanding loudspeaker for your normal sized room, one able to deliver deep subsonics that impress friends – if not neighbours – the big Avon 5s are likely to appeal. They're designed to deliver superb bass into a typical living room 15ft-20ft long, avoiding boom. And you'll love the price – just £1600.

It gets better. The Avon 5s come with ribbon tweeters, admired for giving fast, clean highs, masses of musical detail and sharp stereo imaging. All of which makes the Avon 5 look like a tasty design for the real world.

One reason the Avon 5 is big is because it houses something known as a 'transmission line'. This is a long tunnel in the cabinet that absorbs rear energy from the bass unit, damping it so it behaves well at low frequencies. The Avon's bass units transmission line is terminated in a front-mounted port that you can see as a black



rectangle below the drive units.

Transmission lines are both legendary and notorious in the loudspeaker design world. They look superb in theory and can sound good in practice but always demand a big and complicated cabinet that's expensive to make. In consequence they are – or were – a high-end design idea, used by manufacturers IMF, then TDL.

I say “were” because transmission lines were much discussed since early experiments in the 1960s, but have become progressively less used because of their cost and complexity as well as the success of the simple reflex port. KEF got to grips with the theory of reflex loudspeakers in the 1970s and it all went into computer aided design programmes long ago. Not so transmission lines, they are only just being understood and computerised.

To reiterate then, what we are looking for from the Avon 5 is better damped bass that “plays a bass tune” more evenly than most other (reflex) loudspeakers, and goes lower down the frequency scale too – meaning you get sub-sonics.

Sounds good perhaps, but sub-sonic output needs to be carefully judged if a room is not to boom as a result of having too much low bass pumped into it. A transmission line does this better because it is not, in itself, a resonant (bouncy) system, whereas a reflex is. So you stand a better chance of getting firm, even bass from a transmission line in a real-life room.

Ribbon tweeters shame domes, but they are expensive and difficult to integrate with cone drivers. That's why you see a small 90mm midrange unit just below the ribbon tweeter on the Avon 5, so as to match it in without problems in the crossover region.

And either side of the tweeter and midrange unit, at top and bottom of the array, there are two modestly sized 130mm bass units. Each one is loaded by the rear quarter-wave transmission line. And our measurements clearly showed this line works properly, doing what it is expected to do: go low and not be resonant.

The cabinet stands 111cms high (1.1m) on its plinth, 36cms deep and 21cms wide, although the plinth adds 1cm all round to this and the rear gold plated bi-wire terminals add some too. Weight is a reasonable 26kgs, which is fairly easily liftable.

There are no fewer than eight veneer finishes Castle's website says: Rosewood, Walnut, Cherry, Mahogany, Maple, Natural Oak and Antique Oak. Two removable grille panels cover the bass units individually, but the tweeter and midrange remain exposed. Standard of finish was very good and nothing I would complain about, matching current market norms.

Transmission lines have never been especially sensitive: they need power to go loud. But Castle have done well in minimising this potential drawback: the Avon 5s do need a reasonably muscular amplifier but there are plenty around at good prices and a Creek or Naim would do fine. They need a smooth top and muscular bottom to achieve what I feel to be subjective balance, although this is to some extent a matter of taste and personal preference. Being revealing and projective at



Twin 'speaker binding posts at the rear of the cabinet allow for bi-wiring if required.

high frequencies you do need a high quality digital source to feed them and I fell back to using our superb BDP-105D Blu-ray player with its ESS Sabre32 DAC as a preference, which was a step up on the impressive Texas Instruments (Burr Brown) PCM1792 DAC of the portable Lotoo PAW Gold hi-res digital player, in for review, that I also used as a music source.

SOUND QUALITY

The Avon 5s were run in for 48 hours using bass heavy music as well as pink noise and a Monitor Audio De-tox CD for loudspeakers. I used the sturdy Cambridge CX A80 amplifier for much of this as it was also being run in, but it didn't much suit the Avon 5s, the sound being on the bright and ho-hum side. But it is an inexpensive amp, I thought, and not a quality match. By default I usually start with 'our' Sugden Class A Sapphire FBA-800 power amplifier because I know its crystalline purity well, so I connected it up to kick off 'proper' listening tests and again was underwhelmed. This seemed odd; the odds of two good amplifiers sounding unhappy are low.

We had a McIntosh MC152 power amplifier in for review and so this was next up in the firing line – and pow! With the Avon 5s plugged into its 4 Ohm output I was in business. The sound opened out dynamically, developing life, and there was suddenly more detailing and a sense of background atmosphere. This struck me as a tad odd because the Sugden digs deeper than most amplifiers in this department and Cambridge amps do not lack muscle.

OK, big McIntosh amplifiers, with their unique output auto-transformers, are in a league of their own, being able to inject life into any loudspeaker but the Sugden is supremely subtle and insightful, if not a Mack truck. As I turned up volume to hear how the Avons handled Rock dynamics, using the opening kick drum and bass of Fleetwood Mac's 'Dreams' (a hi-res 24/96 transcription from the master tape), I noticed that the MC152 power meters were flicking up toward 150 Watts! Aha – this was why the low power Sugden wasn't happy.

This experience says a lot. The Avon 5s are dry, clean and mean, but they need a lot of power to lift off – and it needs to be good power. In fact I was hitting 50 Watts on peaks further investigation showed, but



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K3 INTEGRATED AMPLIFIER & CD PLAYER

Roksan's K3 Series of hi-fi electronics put sound quality first. But more than just sounding great, they're also effortlessly simple to use and come in a design that anyone would be proud to put at the centre of their music system.

The K3 Integrated Amplifier has been built with today's discerning audiophile in mind. Boasting five Line Level inputs, an exceptional Moving Magnet phono stage and superior aptX® Bluetooth technology; it is an ideal hub for all manner of audio sources. There is power and bass drive in abundance, with superb sound staging and engaging detail that is both refined and enjoyable.

The K3 CD Player is a high-quality source component that delivers a rich, almost analogue, sound performance that perfectly matches the Integrated Amplifier's delivery. When using these products together, you have a package that is truly unrivalled for the price.



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that is still quite a lot. Being a low load they draw current and magnify differences between amplifiers, making amplifier choice more critical than usual. We also have Quad QMP mono blocks and these better suited the Avon 5s in some areas, if not in others – more of which later.

For signal sources I used an Oppo BDP-105D Blu-ray/CD player and Lotoo PAW Gold hi-res player reviewed in this issue, as well as LP from an Ortofon A95 MC cartridge, in SME309 arm on Timestep Evo upgraded Technics SL-1510 Mk2 turntable.

First, let me get this loudspeaker's balance in perspective. Ribbon tweeters are known for having razor sharp treble and I am not being figurative: they are supremely fast, detailed and forensically clean – and I love them; few dome tweeters come close. So what do most loudspeaker designers do? They ensure this expensive but impressive sounding item can clearly be heard by giving it prominence – and that's exactly what you get with the Avon 5. With the Cambridge CX A80 and McIntosh MC152 amplifiers the Avons had strong treble and whilst carefully balanced to not sound over bright, the Avon 5 is nevertheless pretty forward up top. With our softer sounding yet powerful (300W) Quad Elite QMP monoblocks however, this wasn't so obviously the case.

And bass? Both design and measurement point to the Avon 5s having strong bass that runs very low, able to produce obvious subsonics. And this the Quad Elite

QMP monoblocks made clear to me with Mozart's 'Ave Verum Corpus', where the pipe organ gave a firm foundation to the chorus – the Avon 5s had no problem here. They are well damped and not overly bassy, so in our 25ft long room with no supportive modes, bass level was kept in proportion, but in a smaller room, 20ft or less, modal support would raise low bass. It is always difficult for a designer to judge this balance between room and speaker; too much bass over-excites a room and makes it boom, but too little is unacceptable in a speaker like this. And what I heard over a variety of test and music tracks was a dry, well-damped loudspeaker that went low without restriction, but wasn't bloated.

The soundstage focussed best at tweeter height, sounding wide yet dense in its detailing. All the same, the

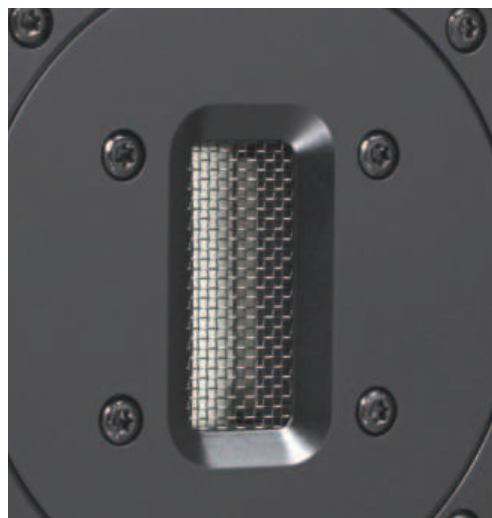


Twin 130mm bass drivers allied to a transmission line give the Avon 5s good, deep, dry bass without any of the bounce associated with reflex-loaded loudspeakers.

On the end of the Quad Elite QMP monoblocks the Avon 5s were generally an easier but less grippy listen, a tad more relaxed all round. Via the McIntosh MC152 their treble was at times obvious-to-

"The dry, low bass of the transmission line better resolved the character of the bass instruments than just about any loudspeaker I've heard before"

The ribbon tweeter makes for a prominent treble performance. Careful amplifier matching is needed to get the best from the Castles.



Avon 5s are consistent at most heights I found, even when walking around. There was no obvious coloration from the drive units but the port gave a hint of chestiness at times.

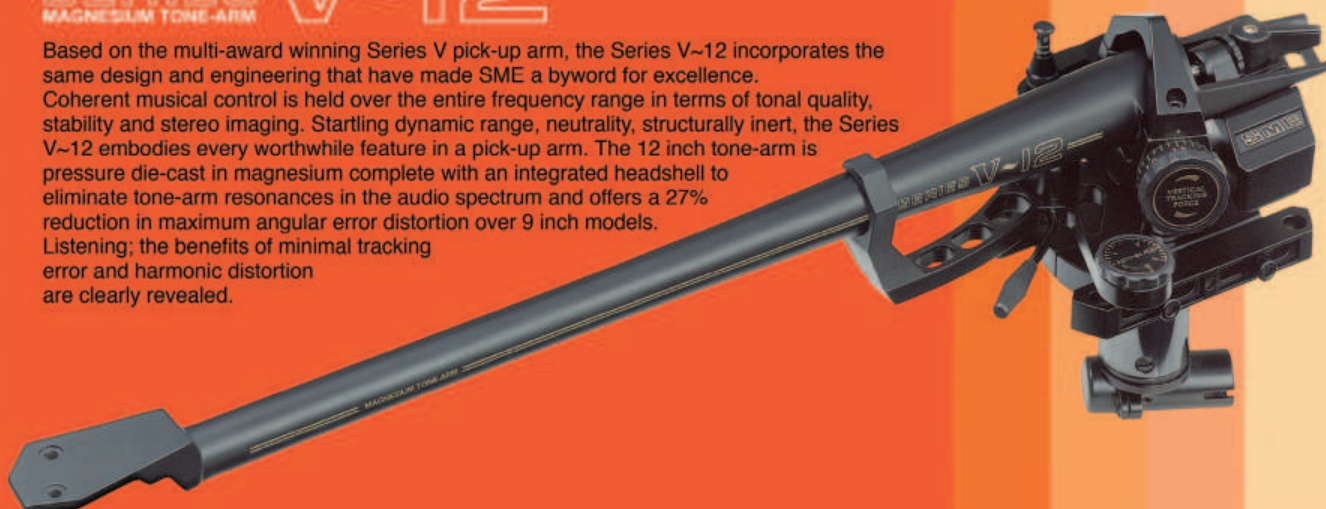
Kept under tight control by the McIntosh MC152 these speakers spat out Fleetwood Mac's 'Go Your Own Way' at seemingly enormous speed, Mick Fleetwood's prominent drumming having great impact but also superb control. The bass line was well expressed, notes clearly delineated, strong and firm.

challenging and didn't flatter every recording, where the Elite QMPs better smoothed things over. So if you audition these 'speakers just bear in mind the drive amp will make a quite-obvious contribution to what you hear (hint: I'd speculate a Naim would suit superbly, with its strong bass and smooth treble, but we didn't have one at time of review).

With Lady GaGa's 'Monster' the dry, low bass of the transmission line better resolved the character of the bass instruments (synth in fact) than just about any previous loudspeaker I've heard before, with the exception of big Tannoys (that cost far more). Low notes were superbly rendered, with an absence of the 'bounce' most reflex ported loudspeakers display, that resonant "boing...boing" quality many people complain about with reflexes. The walking bass line

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in Angelique Kidjo's 'Sound of the Drums' most clearly showed how this loudspeaker differs from most: the notes moved up and down the scale with a clear ease and sense of note resolution, un-smeared by resonant overhang – and that made the Avon's sound very specific in their description of the bass tune being played. There was a complete absence of gloopiness and bass 'generalisation' shall I say, where you get a bass sound and need to aurally interpret what it is: from whence it came and what instrument.

I was expecting Nigel Kennedy's Stradivarius to come across as a little on the shrill side, but instead I got a brightly lit and very obvious rendition of Vivaldi's 'Spring', but one very focussed through the ribbon tweeter – and surgically pure in nature. The Avons threw Nigel at me, as it were (well, his violin at least!) and although perhaps not academically accurate in balance they countered this criticism by upping intelligibility by a few notches against most else. If you like violin you'll be hearing it here! It was impressive.

With Alison Goldfrap singing 'Fly Me Away' torrents of fine detail tumbled from the ribbon tweeters in an insightful performance that was one of the best renditions I have heard yet of this track.

The Avons are tinder-dry in nature and this was evident with Willy de Ville's 'Spanish Harlem', where his guttural voice crackled at me it was so strongly resolved and deeply detailed.

CONCLUSION

What you get with Castle's Avon 5 is superbly resolved bass, where each

and every note on the bass scale is made clear. This isn't bouncy bass, so much as dryly-rendered accurate bass that is tuneful.

Castle's use of a ribbon tweeter has made highs obvious and sharply rendered.

All of which goes to make the Avon 5 a big, yet tight sounding loudspeaker that is highly revealing and very analytical, for very specific reasons engineered into its design. It is a large loudspeaker with some very distinctive properties – and at a relatively low price.

The Avon 5s are impressive loudspeakers in their own distinctive way and well worth hearing. They may suit rooms and tastes better than most. If you want deep bass and razor sharp yet clean highs, these are the ones.



The small 90mm driver is positioned just below the ribbon tweeter to best integrate, without problems in the crossover region.

MEASURED PERFORMANCE

Frequency response of most multiple-driver loudspeakers varies with height and ribbon drivers are especially difficult to integrate because they don't reach down the frequency scale as far as domes. But the Avon 5 manages well on its forward axis at ribbon tweeter height, which is about normal listening height – the height of your ear when seated. Lower down there is a crossover dip but most listeners won't sit low enough to notice it.

The ribbon tweeter reaches up to 20kHz and its output rises a little; the lift is fairly subtle in its subjective impact. There is strong output across the upper

midband, above 3kHz, so detailing will be strong. Overall the Avon 5 will sound tonally balanced, but a tad bright.

Bass output is strong all the way down to 50Hz and the port, which measured +5dB in SPL at 80Hz relative to the bass driver, has strong output down to 25Hz, so the Avon 5 goes low. In a big room it will produce subsonics, but it delivers even output across a broad frequency band so will not sound boomy or one-note. The flatness of the impedance trace (red) reflects this well, showing the acoustic system is very well damped and non-resonant. As a direct result the loudspeaker is a resistive load at low frequencies, albeit a low one that draws amplifier current and this too was borne out in measurement: overall impedance was 6 Ohms, reaching a minimum of 4 Ohms. These are common enough figures nowadays however.

In spite of the current draw, voltage sensitivity was 88dB, where other loudspeakers nowadays manage 90dB, but that's the small penalty paid for delivering strong deep bass. The Avon 5 needs 60 Watts or so to go very loud but it will shake a room low down with this.

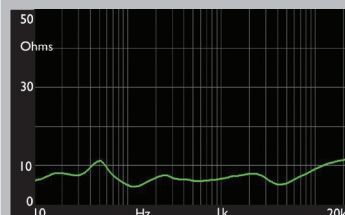
The Avon 5 has been designed to have an obviously wide-band sound, with clean high treble from a ribbon tweeter that has strong output from 3kHz to 18kHz, and plentiful low bass right down to 25Hz, measurement shows. It is for medium to large rooms and amplifiers with some grunt. **NK**

FREQUENCY RESPONSE

Green - driver output
Red - port output



IMPEDANCE



CASTLE AVON 5 £1600



OUTSTANDING - amongst the best.

VERDICT

The Avon 5 is a loudspeaker that challenges all others with its dry, yet deep bass and super clean treble. It offers impressive sound quality different in character to most else – at a low price.

FOR

- razor sharp treble definition
- dry and tight deep bass
- low price

AGAINST

- needs power
- revealing of the amplifier
- does not have bouncy bass

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Blue Cheer

McIntosh has introduced a new entry-level solid-state power amplifier in the shape of the MC152 – but it still packs 150 Watts per channel and sounds sublime, says Jon Myles.

One of the undeniable joys of reviewing hi-fi equipment is that every so often a component comes along that literally blows your socks off.

It doesn't happen every month – but when it does it's enough to have you sitting on the sofa with a big, fat grin on your face and rifling through your music collection as you play track after track long into the wee small hours (preferably with a glass of nicely-matured Scotch in your hand – but that's not strictly a necessity).

So it was with me (well, apart from the Scotch) when the mighty McIntosh MA8000 integrated amplifier arrived at Hi-Fi VWorld last year. Here was a beast of a product – weighing over 100lbs and capable of delivering some 300 Watts per channel of power yet possessed of

such subtlety, finesse and outright coherency that it put most of its rivals to shame. The very definition of an iron fist in a velvet glove.

It's only drawback was the small matter of a £10,000 asking price. Not that it wasn't worth it – but let's be honest, not all of us are fortunate enough to be able to spend that sort of money on a single piece of equipment.

But don't fret. Because if you fancy a slice of the McIntosh sound at a rather more wallet-friendly price then the company has just introduced its new entry-level solid-state MC152 power amplifier.

Being McIntosh (perhaps the very epitome of big and beefy in the amplifier world) entry-level still translates to a weight of 75lbs and a rated power output of 150 Watts per channel – which is highly conser-

vative as we measured a massive 235 Watts into 8 Ohms (see Measured Performance for full details).

Much of that weight is down to McIntosh's use of transformers in the output stage to ensure consistent power delivery regardless of the connected loudspeaker's impedance (see Noel Keywood's piece for a complete explanation).

The MC152 is, though, rather svelte compared to some of the brand's other power amplifiers – being a slim 6in in height with a depth of 21in and width of 17.5in. One word of caution, however; users of three-legged racks will find the power socket at the back of the MC152 falls just where the rear support stands making the use of chunky specialist mains leads a little tricky.

Once in situ, there's no mistaking



this is a McIntosh amplifier – entry level or not. The front panel is dominated by the traditional two big, blue illuminated power meters and the green company logo. A switch allows you to dim the power meter display if you wish while the only other control is the on/off button. Those power meters and big green love them or hate them; I unashamedly love 'em.

On the rear are sturdy binding posts with taps for 2, 4 and 8 Ohm 'speakers, as well as XLR balanced and unbalanced inputs. There's also a power save slider control which when activated automatically turns the MC152 off if it doesn't receive a signal for 30 minutes.

SOUND QUALITY

The MC152 may not have quite the prodigious arc-welding power of some of its bigger brethren but it still has the traditional McIntosh strength of exercising a firm grip over virtually any loudspeaker you care to pair it with.

Hooked up to our reference Tannoy Definition DC10Ti floorstanders (via the 4 Ohm 'speaker taps) and fed a variety of files from CD to 24bit/192kHz high-resolution via the impressive Chord

2Qute DAC (see review elsewhere this issue) and the MC152 impressed from the off with its big, spacious sound.

On King Tubby's 'Dub Fever' collection the MC152 proved capable of generating earth-shaking levels of bass yet without losing the sense of air and atmosphere that pervades these tracks and makes them work so well.

Electronic beeps and chopped, distorted guitar effects emerged from seemingly nowhere – swelling into the mix and then disappearing in the blink of an eye.

Just as importantly the McIntosh threw a big, wide soundstage into the room which made the listening a truly immersive experience.

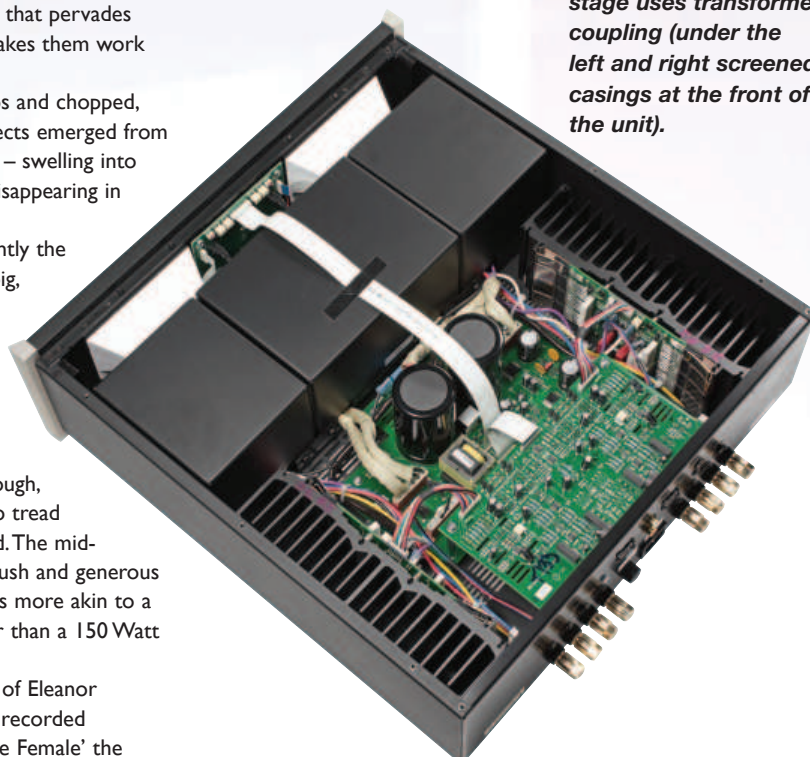
Importantly, though, the MC152 can also tread gently when needed. The mid-band has a slightly lush and generous quality to it which is more akin to a good valve amplifier than a 150 Watt solid-stater.

On a 24/96 rip of Eleanor McEvoy's delicately recorded 'Non Smoking Single Female' the

McIntosh imbued the walking bass part with real timbre while vocals were wonderfully rich and romantic. The track simply flowed in a natural, organic manner.

Yet this isn't done at the expense of essential detail. The MC152 has the

The MC152's output stage uses transformer coupling (under the left and right screened casings at the front of the unit).





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ability to catch the leading edge of notes and subsequent decay without the artificial haze some transistor amplifiers impart. This made it sound wonderfully lifelike.

Moving onto something a little fiercer in the shape of The Sex Pistols' 'Never Mind The Bollocks...' and I could hear why McIntosh has long been a favourite with rock fans. The marching boots at the start of 'Holidays In The Sun' had me thinking an invading army was streaming across the room while Steve Jones's opening guitar chord wasn't just big, it was positively gargantuan. And when the pile-driver drums and bass kicked in I could thoroughly understand why one reviewer famously described this album as a big, bad beautiful sound. The McIntosh MC152 made it sound all of those things – and in all the right ways.

Overall, it was the combination of power, control and overall coherence that made the McIntosh work so well with seemingly all musical genres. I'd never mistake Stanislaw Skrowaczewski and the Minnesota Orchestra's rendition of Ravel's glorious 'Rapsodie Espagnole' for the Sex Pistols, but it was just as thrilling via the MC152.

Individual instruments were located firmly in place within the stereo image, with good height and depth, while the dynamic contrasts between the various movements were handled with pinpoint precision.

The work ends with an exuberant burst of orchestral colour in the fourth movement and the McIntosh captured all the joie de vivre of the finale without ever letting it spiral out of control or congeal into an indistinct cacophony – even with the volume pushed well higher than usual.

If I'm going to level any criticism then I have to say that the same piece played through the mighty MA8000 did have slightly more air and space to its delivery than on the MC152 – giving it a little more overall grandeur and impact. But if you'd never heard the former it's not something you'd ever be worried about.

That's because this new McIntosh power amplifier is a very impressive piece of equipment in its own right. It may be the smallest of the company's range of power amplifiers (both in terms of physical size and power output) but it still packs a significant punch – combining a big, punchy sound with a liquid, thoroughly



Both balanced XLR and unbalanced RCA inputs are provided, as well as taps for 2, 6 and 8 Ohm loudspeakers.

musical midband and a detailed delivery. I can well see it recruiting a lot more hi-fi lovers into the ranks of McIntosh converts.

CONCLUSION

McIntosh's new MC152 combines plentiful power output with a sonic signature that brings the best out of all genres of music. It can be subtle and fleet-of-foot when needed – yet is just at home pounding out deep bass lines, crashing guitar chords or orchestral crescendos. Not just a cut-down version of McIntosh's bigger power amplifiers but a great performer in its own right.

NOEL SAYS -

The absence of distortion in big auto-transformer coupled McIntosh amps is eerie and I suspect the output stages swing more voltage and less current than is common, because as you reduce current you minimize both distortion and thermal modulation at the output transistor junction. This eases the job of the output transistors, protects them and also makes 2 Ohm electrostatic loads no problem.

Feedback is taken from the output devices direct, and from the transformer, via a summing network – neat design.

The MC152 is also fully balanced all through, currently a rare topology but one that will become more popular as sound quality benefits are better understood and appreciated.

MEASURED PERFORMANCE

The MC152 produced 253 Watts into an 8 Ohm load and slightly less, 225 Watts, into a 4 Ohm load. Unlike most transistor amplifiers the use of output transformers means it is effectively load matched, rather than being a 'constant-voltage source' so maximum power is the same into any load. However, McIntosh also use voltage limiting as protection and

the output was prevented from going into serious overload. The MC152 is very powerful all the same and its 2 Ohm output is meant for electrostatic loads.

Distortion was very low at all frequencies, measuring 0.005% in the midband and 0.02%, mostly noise, at 10kHz, 1 Watts output. Our spectrum analysis shows an absence of crossover distortion harmonics and this was maintained right up to full power out at 10kHz, an impressive performance. Low frequencies had no impact on the transformers either, distortion at 40Hz, full output measuring 0.007%.

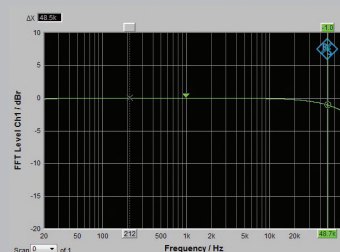
Frequency response rolls off slowly above 20kHz, and below 10Hz, but the amplifier measured flat across the audio band into 8 Ohm and 4 Ohm loads.

Input sensitivity was low at 1.6V through the phono inputs for full output, and no less than 3.2V through the balanced XLR inputs.

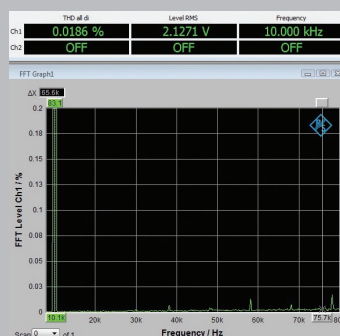
The MC152 is powerful and measures exceptionally well all round. It has very low distortion and can drive any load. Impressive. **NK**

Power	250Watts
Frequency response	5Hz-50kHz
Separation	110dB
Noise	-121dB
Distortion (1W, 10kHz)	0.02%
Sensitivity	1.6V

FREQUENCY RESPONSE



DISTORTION



MCINTOSH MC152 £4995



OUTSTANDING - amongst the best.

VALUE - keenly priced

VERDICT

Iconic looks matched with a big, expansive and detailed sound make the MC152 one of the best power amplifiers you'll hear at its price. Highly recommended.

FOR

- smooth and musical
- controlled, deep bass
- slim case
- price

AGAINST

- weight

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Lotoo Winner

It's big, it's bulky and it's finished with gold – but Noel Keywood discovers this new portable music player from China's Lotoo offers class-leading high-resolution sound.

In the technological arms race of the portable player market, the Lotoo PAW Gold I'm reviewing here is firmly in the 'interesting' category. This high-resolution digital player is big and heavy like few others; it is also £1495 – quite a ticket. But that's because it uses top-quality hi-fi parts – and to hell with power consumption! Just make the battery larger. But you end up with a machine that is more luggable than pocketable. I could almost describe the PAW Gold as a portable hi-fi rather than a portable player.

That's the basic and somewhat fundamentalist approach Lotoo (China) have taken in conceptualising this player. Not only is there

a current guzzling, full-blown hi-fi digital-to-analogue convertor (DAC) on board – a Texas Instruments PCM1792 – but also an LME49600 headphone drive chip and a powerful ADI Blackfin 541 signal processor that brings almost instant start-up, as well as the ability to handle even the most demanding DSD playback. So sound quality has been pursued to the exclusion of most else in this machine; it's an extreme design.

Before I start to peer into the details let me just make clear what I am dealing with here. The PAW Gold is a portable audio player designed to drive either headphones or a hi-fi system. You can think of it as a CD player, one able to play just about any high-resolution digital file available – and it has been designed as such, because it runs from an independent 12V power supply not the 5V line within USB like most other players.

There is no digital output for an external DAC but I guess Lotoo see no need because with a full blown, mains powered DAC on-board it out-performs most external DACs in any case, our measurements showed. And I read the other day a comment from FiiO (also of China) that few people use the digital output of their players. Whether this is justifiable only listening can tell, more of which later.

So what we have here then is a super high-fidelity player with masses of on-board lithium-ion battery power to sustain it on the move – 11 hours playing time no less – but with a well worked out architecture for delivering top quality as an analogue connected

'CD player' in the home, able to drive the hi-fi. This makes the PAW Gold a very interesting proposition to any audiophile, methinks – and a headbanger of a portable.

Lotoo are proud of the fact that the case is machined from a solid billet of aluminium that, they say, weighs 280gms – and it did on our scales. That's double the little 136gm FiiO X3 2nd gen I reviewed last month.

Like the FiiO, the Lotoo plays just about every music file format available, including SACD files, that are different in structure to DSD files, whilst using the same one-bit code. In addition you can play Flac, Wav, Alac, MP3 and DSD 64 and 128 in dff and dsf form. There's also less popular wma, Ape wavepack, Cue and m4a. But where is Apple's Aiff (their equivalent to Wav)? I thought this was a mistake but it isn't – the PAW Gold doesn't see them I found, so they must be converted with XLD or similar.

The PAW Gold feels brick-like in the hand – solid beyond expectation. It is very obviously machined with care and well finished too. Whether you like the gold finish of its parts is a matter of taste I think; I had slight reservations about the small and coarse 160x128 OLED colour screen, with its jagged-edged text – and in spite of price this is not a touch screen, as on Astell&Kern players. You have to click your way down through a cramped, grey on-screen music menu to select a track, using the central gold disc, that is a stationary selector, not a spin wheel as on FiiO's X3. None of this fitted too well with the price, but it did the job.





Computer connection is through a USB lead. Memory comprises a full size SD card.

The settings menus were similarly small, cramped and illegible. There is, however, some mitigation in an output level bar-graph display that covers 50dB dynamic range and gives some idea of the intrinsic recorded range of any music file; however, it is situated after the volume control

reduces this to a sensible 0.8V, about right for most else and not so far from European recommendations concerning limitation of hearing damage.

The Line output can be connected to the CD input of any amplifier, through a 3.5mm jack-to-

"Mick Fleetwood's opening drum roll of 'Dreams' (24/96) suddenly had both speed and punch and there was tremendous grip on pace; this player has chiselled timing"

to show output volume, rather than before it to show absolute recorded level. You can see recorded level by turning volume up to maximum – but only after removing the headphone plug because the PAW Gold goes fiercely loud!

On that subject I'll note that our measurements showed this player produces a massive 4.4V output from the headphone (Phone) socket with output set to High (H) – more than enough for insensitive planar magnetic phones (e.g. Audeze, HiFiMan, Oppo). The low setting (L)

phono plug adaptor lead, and it gives full CD output level. But whereas a CD player provides only low-res PCM digital of 1983 vintage, a hi-res player like this can send any exotic audio file to your hi-fi.

Since the player gave me a 'battery discharging' warning whilst connected via USB to my powered USB hub, power is not drawn from the 5V USB line at all, unlike most players. Instead the PAW Gold charges from its own 12V/1.5A, switch-mode, wall-wart power supply that connects to the usual

power input on the player, marked 12V/1A. Although it seems a little more cumbersome, this is the best way to deliver power: it gives higher supply volts to the DAC and output amplifiers – and that's why 4.4V output is available, because that's what you get from a 12V d.c. supply. It also means the PAW gold comes as an all-in-one, optionally mains powered player; an external USB supply is not needed to keep it up and running.

There is no internal memory, and just one slot for a full sized SD card – addressable at up to 2TB Lotoo say. But 128-256GB is the common maximum for an SD card and it will



The small screen conveys lots of info, including track format and music level.



A multi-band equaliser is included.

store plenty of 400MB files if you feel you need to do this. The PAW Gold will play not just 192kHz sample-rate PCM, but even 384kHz, and these are of huge size. But I have yet to hear any difference between 96kHz and 192kHz sample rate files, let alone 384s like DXDs, so it is a non-issue for me for the time being – and I think a little off-the-planet as things currently stand.

OK, DSD files are large and they do sound exceptional, so DSD users may or may not feel 320 songs of 400MB on a 128GB card limiting, but the solution here is to have/carry multiple cards.



The top carries headphone and line (fixed volume) outputs, a Low/High switch and rotary volume control.

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Lotoo include a wide range of filters and equalisers to alter sound according to taste.

SOUND QUALITY

The last time I listened to a player and thought "wow" was with Astell&Kern's original AK-100. It blew everything else away. Clamping Oppo PM1 planar magnetic phones onto my ears and setting the PAW Gold to play again had me thinking "wow". This is a spectacular sounding player. It has vast dynamics, deep insight and is almost brutal in its delivery. Where a lovely player like FiiO's X3 2nd gen came over as pure and delightful, the PAW Gold comes over as crushingly powerful in its sound. The Oppos usually sound a tad warm and slow against other phones, if deeply smooth rich and insightful. All this changed. The PAW Gold lit a fire underneath them; they picked up and ran, suddenly displaying speed and pace, driven hard by the player's LME49600 output amplifier. Mick Fleetwood's opening drum roll of 'Dreams' (24/96) suddenly had both speed and punch and there was tremendous grip on pace; this player has chiselled timing.

Not only is there dynamic power aplenty, but cymbals and percussion in this piece were rhythmically rock steady; it was almost eerie!

'Go Your Own Way' gave more of the same: Usain Bolt pace straight out of the blocks, every step perfectly timed; the PAW Gold is a breathtaking listen. My only surprise was that the Oppos were dried out a

little, sounding less bloomy and warm, tighter and under better control; the player exerts a lot of grip and this alters bass quality, but for the better.

There was plenty of low level atmosphere around close-miked vocals and this quality was very apparent with Benjamin Grosvenor's rendition of Chopin's 'Nocturne No5, Opus 15 No2' (24/96), where the piano stood in a sense of open space, each struck key having a well-hewn presence of his finger work under wonderful control.

Life and listening got better with a 352kHz sample rate DXD file running at prodigious 17Mbps bit rate of Mozart's 'Violin Concerto in D Major', played by Marianne Thorsen and the Trondheim Solistene (soloists), that occupies a mere 1.2GBs of storage space. OK, so there's tape hiss at the start – or is it the mic preamps that my Oppos detect? – but the violin and orchestra sounded crystal clear, upon a huge sound stage – and again I heard wonderfully precise timing. The PAW handled DSD 64 and 128 files in tests; it flinched at nothing except Aiff.

CONCLUSION

Lotoo's PAW Gold is an impressive piece of dedicated engineering. It isn't the sleekest player by a long mile, but its sound quality is quite extraordinary. If you want to carry your home hi-fi with you, this is the one. It has a lofty price tag as portables go but not as hi-fis go, nor high quality digital sources; a good CD player can cost more. Yet this machine far surpasses CD, playing all high-resolution digital music files with an ability that is astonishing. A superb player then, even if its user interface could be a little more attractive.

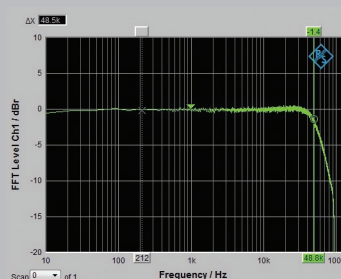


The screen is small and has low resolution, so text is jagged looking.

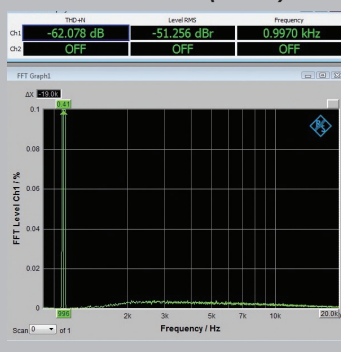
MEASURED PERFORMANCE

Frequency response through the headphone output, at maximum output (H), measured flat to 49kHz with 192kHz sample rate digital, our analysis shows, with a roll off above the frequency to the 96kHz upper limit – a good result that shows the PAW Gold exploits high

FREQUENCY RESPONSE



DYNAMIC RANGE (60+62)



sample rate digital. Results on low output (L) setting were the same and the Line output gave an identical result to headphone.

Distortion at full output (4.4V) measured a low 0.0003% and at -60dB a very low 0.05%, with 24bit resolution digital. We measured EIAJ Dynamic Range at a very high 122dB, exactly in line with Lotoo's own result and that quoted by Texas Instruments. This is around 7dB more than rivals, that mostly come in around 115dB.

The fixed Line output delivers 2V, like a CD player, and its dynamic range was similar at 122dB.

The Lotoo PAW Gold measured very well in all areas. It's massive 4.4V output will drive even the most insensitive headphones and dynamic range is that of top mains powered DACs. NK

Frequency response (-1dB)

CD	4Hz-49kHz
Distortion (%)	
0dB	0.0003
-60dB	0.05
Separation (1kHz)	110dB
Noise (IEC A)	-120dB
Dynamic range	122dB
Output (headphone)	4.4V
Output (Line)	2V

LOTOO PAW GOLD £1495



OUTSTANDING - amongst the best

VERDICT

Fabulous sound quality from a technically superb portable that also serves as a hi-fi player able to deliver devastating digital into any audio system.

FOR

- sound quality
- great portable and stationary player
- plays all digital audio files
- solid build

AGAINST

- heavy
- low resolution screen
- needs menu refinement

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- Hi-Fi News | September 2015



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MC301 monoblock amplifier (pair)

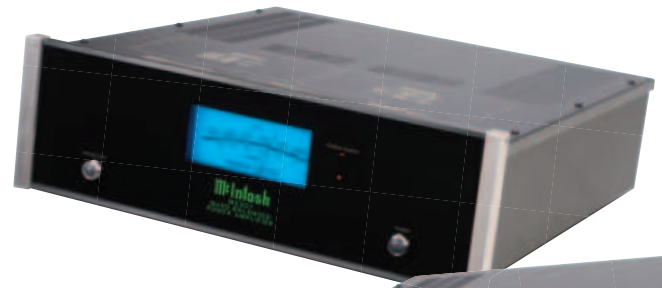
Retail price	0% Finance*: 20% deposit, then
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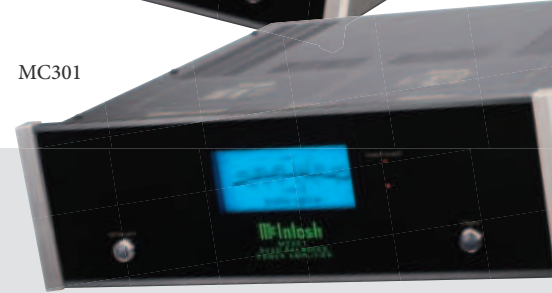
MC152 power amplifier

Retail price	0% Finance*: 20% deposit, then
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MC301



MC152



NEW

D150 | digital preamp

The D150 uses the same revered DAC as the D100, featuring an 8 channel, 32-bit, 500kHz D/A converter with wide dynamic range and extremely low distortion.

The D150 digital stereo preamplifier expands McIntosh's digital music capabilities by supporting many of the newest digital audio formats such as DSD and DXD. A USB input accepts up to 32-bit/384kHz signals and supports DSD64, DSD128, DXD 352.8kHz and DXD 384kHz. It is a simple solution to add the latest digital music formats to your existing system.



D150

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NEW



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Old school charm

Martin Pipe listens to a new CD player from Roksan that simply plays...CDs!

Of the CD players I've come across of late, most seem to offer spinning of those silver discs as little more than an afterthought. CD players might have been icons of high-tech in the '80s but things have moved on. And the manufacturers, endlessly trying to leapfrog the competition, realise this. They would rather you focused on the ability of their latest babies to catch Internet radio stations from Afghanistan to Zimbabwe, interface to whatever iThing happens to be in vogue or pull music from computers and networked storage devices.

So with this in mind it's refreshing to come across the Roksan K3 CD. Don't let its svelte modern styling and opulently-machined metal frontage fool you. The K3's single role in life, like that of the 1982-vintage Sony CDP-101 I revisited in *Olde Worlde* some months back, is to play CDs. No USB ports, no Wi-Fi,

no Bluetooth, no kitchen sink. But there are other similarities between that archaic first-generation Sony and the streaming-age (but streaming-incompatible) Roksan, even though in performance terms the two are worlds apart.

Both are tray-wielding front-loaders and both are controllable via a remote. In the case of the K3, that means a diddly but substantial one offering the basics – previous/next track, play/pause, stop, repeat and shuffle. This 'R7' will also operate some other Roksan products, and has nice big buttons. You can't use the handset to place the K3 in standby; turning the player on or off involves flicking a rocker switch tucked away, as is the Roksan tradition, under one of the sides.

Basic K3 operation is also possible from the front panel, which also hosts a rather small blue fluorescent display. This indicates track number and running time, which can be switched between total,

elapsed and remaining time. The K3 has no truck with gimmicks like MP3 CD-R playback (audio CD-Rs and CD-RWs are compatible, though), direct track-access or the ability to remember your favourite selections. It's all elementary 'no-frills' stuff, but this means the K3 is wonderfully responsive and easy to use.

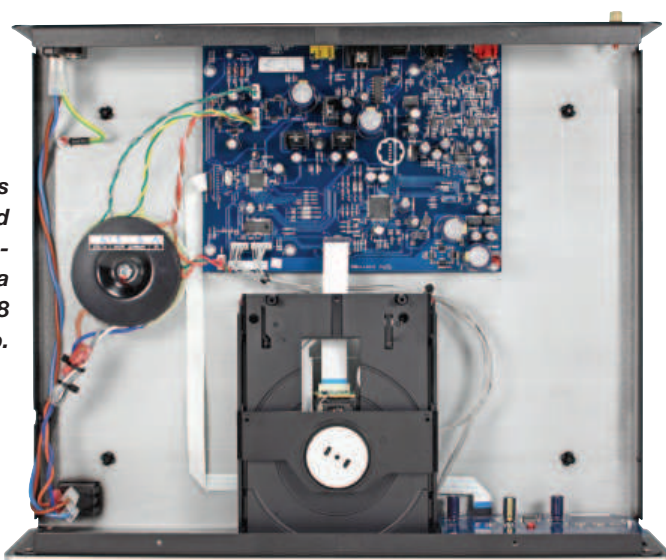
The K3 may abstain from gadgetry, but you certainly get all of the connectivity expected of a CD player. Analogue outputs are phonos, the only balanced connection being the AES/EBU digital output that Roksan has provided as an alternative to the usual optical and coaxial feeds – the Red Book-raw 44.1kHz/16-bit of the digital data on your disc as no upsampling tricks are performed here. Roksan has also, for some reason, included a grounding terminal.

It's heavy and substantially-built, and a look inside reveals that Roksan's preference for neat and uncluttered design goes beyond the exterior. Much of the CD circuitry is on a single NEC 'jungle' chip. This interfaces to another chip that looks after the loader mechanism's various motors and the Burr-Brown PCM1798 that turns your digits into music. All of the analogue audio circuitry downstream of the latter is based around standard NE5534 op-amps, as found in much pro gear; tubes are nowhere in sight! Roksan has specified a linear power supply, built around a toroidal transformer.

SOUND QUALITY

For the listening tests, I partnered the K3 with an Arcam FMJ-A49 integrated amp and Quadral Arium Wotan VIII speakers. Also tried was a Benchmark DAC2 HGC DAC/headphone amp, driving a pair of Oppo PM3 cans (reviewed on Page

Internally the K3 CD is neat and uncluttered and utilises surface-mounted ICs and a Burr-Brown PCM1798 DAC chip.





39 this issue). First into the K3 was a copy of Steve Reich's 'Music for 18 Musicians' (Ensemble Signal/Brad Lubman, Harmonia Mundi). The insistent rhythmic flow and urgency of this deceptively-simple piece proved to be well within the K3's pacing abilities.

So too was the range of layered tonal textures – among them strings, pianos, marimbas, clarinets, vibraphones and voices – that pour over the spellbound listener in waves.

Energy, richness, definition and an immersive soundstage are all in evidence

here. Switching between the Benchmark's internal DAC (fed from the K3 coaxially) and the player's analogue output confirms a slight tendency towards brightness but such character complements this particular music.

It also gave a slight 'edge' to the percussion of, for example, Joy Division's 'She Lost Control' (Unknown Pleasures) as well as dance music built around the Roland TR808. The latter was apparent with mix CDs, which were dealt with correctly in other regards – no audible 'gaps' between tracks here!

However, it doesn't always work – especially if the recordings aren't up to it. The treble emphasis of the remastered CD of Steve Wonder's 'Songs In The Key of Life' yielded a perceptibly 'forward' sound, certainly in direct comparison to the Arcam FMJ-S27 that's usually connected to the A49 here.

But that's the only real contribution and it's slight. In low-frequency terms, and the key presence region, the K3 proved to be marvelously neutral and balanced. And the emotional connection is preserved. A disc of Simon Rattle conducting the Birmingham Symphony Orchestra for a revered (and remastered) performance of Stravinsky's 'Firebird Suite' was suitably immersive here – with atmosphere and dynamics. And, played on the K3, its 'Infernal Dance' did not fail to thrill.

CONCLUSION

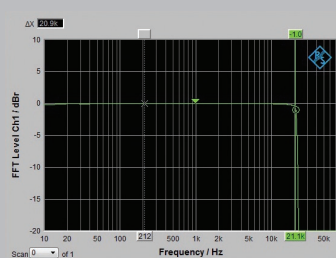
If you want an unpretentious and reliable product with one purpose in life – playing your CDs well – there's much to be said for this Roksan. Give it a decent recording, and it will reward you with an engaging musical performance.

If you do want more, though, you might be interested to learn that an uprated version that can also be used as a basic hi-res DAC has just been launched. We hope to be examining it shortly.

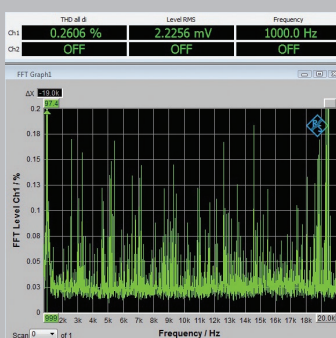


MEASURED PERFORMANCE

FREQUENCY RESPONSE



DISTORTION



Frequency response through the line output measured flat to 21.1kHz our analysis shows, with a fast roll off above this frequency introduced by anti-alias filtering – a normal result for CD.

Distortion at full output measured a low 0.001% and at -60dB a normal 0.25%, most of which is 16bit quantisation noise in fact. EIAJ Dynamic Range measured a healthy 100.4dB, a fair result as far as CD goes. Output of 2.2V met CD Red Book standards.

The K3 produced a good if normal set of results for CD, with flat peak-free response and adequate dynamic range. **NK**

Frequency response (-1dB)	4Hz-21.1kHz
CD	
Distortion (%)	
0dB	0.001
-60dB	0.26
Separation (1kHz)	98dB
Noise (IEC A)	-112dB
Dynamic range	100.4dB
Output	2.2V

ROKSAN K3 CD PLAYER £1250



OUTSTANDING - amongst the best

VERDICT

A very good, basic CD player with great timing and good tonal balance.

FOR

- superb timing and tonality
- very easy to use
- solid build quality

AGAINST

- CDs, and CDs only!
- brightness occasionally evident
- display is rather small

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WIN A LEEMA ELEMENTS CD PLAYER WORTH £1,395 IN THIS MONTH'S GREAT GIVEAWAY!

Here's your chance to win the superb Leema Elements CD player worth £1395 that we reviewed in our June 2015 issue. Just read the review excerpt below and answer the questions to the right.

"The Elements CD player measures a compact 217mm x 90mm x 375mm (W/H/D) although despite its small size it feels reassuringly solid. The draw-loading transport mechanism slides in and out without any undue mechanical noise and disc reading is quick.

Inside the Elements features Leema's latest Quattro-Infinity DAC technology which utilises four 24bit/192kHz DACs feeding balanced input analogue filters.

The sculpted metal front panel contains a blue display panel flanked by small control buttons for standby, scan, play/pause, stop/eject and repeat. The latter also gives access to Leema's proprietary LIPS system - which allows the CD to control other products from the company's range when used together.

These functions are replicated on the supplied system remote which also has the facility to turn the

illuminated display off if preferred.

The rear panel contains coaxial and optical S/PDIF outputs for using the Elements as a transport feeding an external DAC and, unusually, twin pairs of balanced XLR and unbalanced RCA connectors.

It has an easy-going, fluid sound that never sounds overly forced or digital. Vocals are suitably rich and emotional and refreshingly, the Elements also doesn't boom the bass out at you like some CD players. Not that it is lacking in low-end - but it's full, weighty and tuneful with no hint of flabbiness. It's a nice presentation that makes music easy to listen to".

For a chance to win this great prize, just answer the four easy questions at right. Send your entries on a postcard only by October 9th to:
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QUESTIONS

[1] What sort of transport is used -

- [a] Slot-loading
- [b] Bus
- [c] Tram
- [d] Draw-loading

[2] Leema's latest DAC technology is called -

- [a] Frank
- [b] Quattro-Infinity
- [c] Bernie
- [d] DAC Four

[3] How do vocals sound -

- [a] Incomprehensible
- [b] Mumbled
- [c] Rich and emotional
- [d] Garbled

[4] The analogue input filters are -

- [a] Balanced
- [b] Unbalanced
- [c] Hard to find
- [d] Fiddly

entries will be accepted on a postcard only

JULY 2015: JBL STUDIO 290 LOUDSPEAKERS WINNER
Mr. Ian Clement of Lancashire

mail



Visit our website at www.hi-fiworld.co.uk or send your emails to letters@hi-fiworld.co.uk. Letter of the month wins a pair of KEF Q100 loudspeakers.

Answers by: **NK** - Noel Keywood; **JM** - Jon Myles; **PR** - Paul Rigby; **MP** - Martin Pipe; **RT** - Rafael Todes.

LETTER OF THE MONTH PRIZE



KEF Q100 LOUDSPEAKERS

For more advice see Letters from earlier issues at www.hi-fiworld.co.uk/letters

A pair of KEF Q100 loudspeakers are on their way to JEREMY DUNN, Letter of the Month winner in our September 2015 issue.

Letter of the Month



Pro-ject say their Phono Box has an ultra-low output impedance, meaning it will – or should – be able to drive a 3.5m cable across Graham Ralph's lounge. This allows a turntable to be conveniently sited, away from the hi-fi.

DISC AT A DISTANCE

I have finally lived up to my promise to redecorate the lounge, with the knock-on effect that some new furniture has appeared, resulting in a different layout. This also means a new home for the hi-fi. Fortunately, my wife appreciates the quality of the music even if she does wish it involved less boxes, so it is only moving to a new location within the room.

However, the turntable will be some distance from the amplifier and this is where I need your guidance. I estimate I need an interconnect between 3 and 3.5 meters long plus it needs to be flexible as its journey from phono box to amplifier involves a few gentle bends. I am assuming the phono box needs to be located near to

the turntable to boost the signal before travel to the amplifier. Will this distance result in signal loss and degrade the sound? If you could suggest a suitable interconnect that would complement my system over this distance and is flexible it would help me finish the job. Budget is up to £250.

I am also considering changing my phono box when the above is sorted and have been considering a Rothwell Audio Rialto. Do you have any suggestions in the £500 mark that would be a worthwhile improvement in sound or even help with the above issue. It would need to be small in size, not another large box!

My system is: Arcam A85 integrated and P38 power, bi-amped to B&W CDM 7NT speakers, with a Pro-Ject

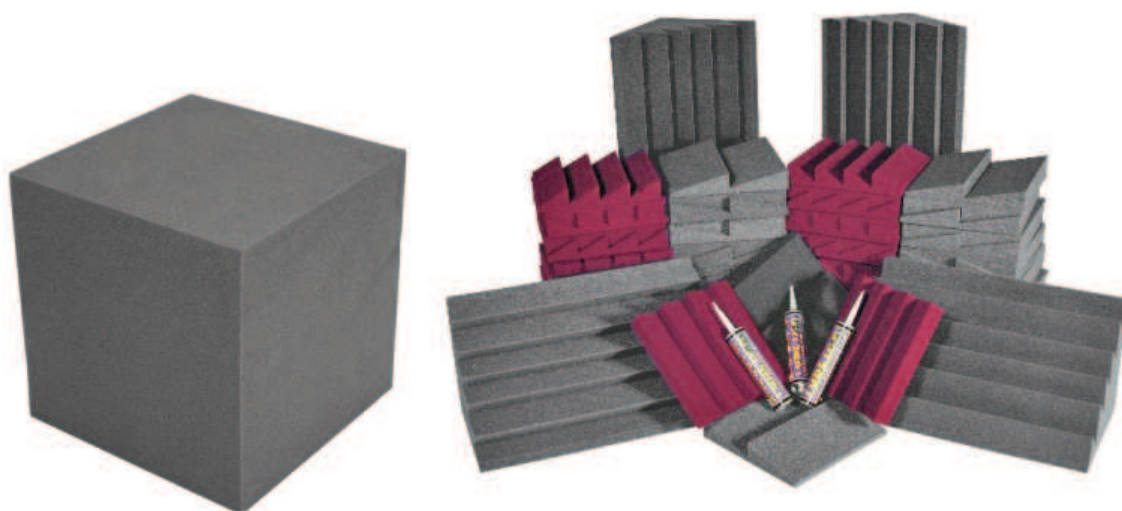
Expression III turntable, Pro-Ject Phono Box MM/MC and a Sony CDP-XB920E QS CD Player.

Many thanks for a great read each month.

Graham Ralph

Hi Graham. A 3.5m interconnect from Pro-Ject Phono box to the amplifier is long and will place up to 1nF of capacitance across the output (at 250pF/metre) that on-line calculator at <http://www.sengpielaudio.com/calculator-RC.htm> (call me lazy!) tell me has an Xc of 7kOhms. Pro-Ject say the Phono Box has "Output stage with ultra-low impedance" but don't say what that impedance is so I will guess it is 100Ohms – a common enough value. This will be unaffected by a 3.5m cable, at least in terms of treble loss, and you could use a much longer cable. I have, however, ignored radio pickup and d.c. resistance. The latter should not be an issue, and the former depends upon "local conditions" as they say, or how many wi-fi boxes you and your neighbours may be using. It is unlikely, however, that the 500mV-IV or so the Phono Box will send down the cable this will be an issue. As you say, the Phono Box must be beside the turntable and its output feed the line. So try it and see, is my advice, using any good quality interconnect.

NK



Use bass traps in corners where sound waves “congregate”. They absorb bass energy and control room boom.

BUSHES OF DIFFUSION

Thanks for the advice to my last letter Noel – your answer was very novel and enlightening. It also made my wife smile, especially when the solution did not involve the purchase of any more kit. We will be skipping down to the local garden centre this weekend to choose some judicious specimen bushes, hopefully something we can both agree on and has plenty of thick foliage. Just one quick question that I would like your opinion on and its to do with placement of the bushes (I guess it's not the usual question you get regarding placement).

I was reading on-line that the best way to diffuse sound reflections is to place the sound diffusion material i.e. the bushes, (the article was talking about a bookcase with different size books), behind or to the side of the speakers. The article also went on to say that corners of rooms are notorious for collecting standing waves which I guessed from the article must be something that should be avoided and was wondering if to solve this problem the bushes were best placed here to diffuse those standing waves. I understand all rooms are different so you wouldn't be able to give a definitive answer and I'm guessing the answer to my own question is to experiment and what a fun experiment it is going to be too. I'm quite excited about it to be honest and I will definitely let you know the results of my experiment with a couple of pictures. Once again thanks for such an eclectic answer to my rather unfortunate problem

Mark Wilkinson
South Tyneside

Hi Mark. The idea of using bushes comes from their use on motorways to break up (diffuse) traffic noise. But what a lovely idea for the home!

With a bit of imagination you can quite usefully improve the acoustics of a room by various methods without it being obvious, my favourites being small rugs hung like pictures from a picture rail to absorb side wall reflections, wall-to-ceiling full-width lined curtains – expensive – and plenty of generously proportioned foam filled settees, or armchairs. You end up with a “quiet” room that has a cosy feel about it, but sounds good.

The article you read is right that standing waves “congregate” in corners, but these are low frequency resonant modes and they affect bass. There is quite a lot of energy in them so you need large volumes of acoustic foam to absorb this energy, hence the settees I suggest.

Plants and diffusers perform a different function: they break up sound further up the frequency scale. You will very much need this in a glass conservatory. However, those bushes will not absorb low frequencies effectively and you will find putting them in corners affects bass little.

For corners, you can use corner absorbers (aka bass traps), which are blocks of sculpted acoustic foam, but I have not had much success with these, I suspect because I have never used enough of them: they become visually intrusive and start to chew up space. But note this is about curing bass boom in a

room; it isn't about absorbing or diffusing reflections off hard surfaces, something plants can do.

Have fun with your experiments.

NK

ON Q

In the June edition you kindly answered my question as to whether I should upgrade my ageing Marantz CD63 KI or purchase one of the new breed of DACs. The advice you gave was to get an Audiolab Q DAC. I took your advice and managed to get one for half price, brand new, presumably because Audiolab are going to release an updated version in due course.

I am so glad I took your advice – I am delighted with the results. It provides a more detailed, more comfortable sound and it seems to allow more of the music through, without having to turn the volume up as high. Is this because the DAC has a lower noise floor?

Would a dedicated transport improve the sound even more? I wondered if the matching Audiolab CDT would be a good idea?

Finally, optical or coaxial cable, which is better?

Thank you for your advice so far

Dave

Hi Dave. Thanks for your feedback – and we are always glad our advice is helpful. Although having said that, the ESS Sabre32 DAC inside Audiolab's Q DAC is a bit of a no-brainer it sounds (and measures) so good. ESS not only reduce digital and analogue noise to levels other DACs cannot reach, they also eliminate

the repetitive noise patterns that digital generates, and which subliminally upset our auditory response. That's why the Q DAC has a "more comfortable" sound (like it!) than other DACs. Our in-house Oppo BDP-105D Blu-ray player with its ESS Sabre32s also has that quality in buckets, and it makes digital listening very easy. And as you say, you better hear into the music.

I believe the Marantz CD63 had a good transport mechanism with low jitter, so the Audiolab CDT may not make a big difference, but I am speculating here: I have not compared the two. Try and get an audition if you can. It isn't difficult to arrange: just take your Marantz to an Audiolab dealer and I'm sure they won't mind you making an in-house comparison.

Supreme musician and expert contributor Rafael Todes insists electrical S/PDIF is more accurate and revealing than optical – and broadly speaking the underlying theory supports this. Optical has to go through send and receive transducers and the plastic optical cables used in dated S/PDIF are cheap, crude and outdated I am told, compared to fine modern glass cables. So optical doesn't sound very promising.

Having said that optical usually has a slightly smoother, less mechanical quality and has traditionally been my choice, much to Rafael's dismay! Again, it is best to listen and compare if possible.

Oh – and one last word on optical. It will always transmit 24/96 digital, but often not 24/192; if you play a 24/192 digital file the system will fall silent – distressing. Both optical transducers (i.e. transmitters and receivers) are responsible for this, and so are optical cables; one cable will pass 24/192 where another will fall silent, because it is unable to support the optical data rate due to insufficient optical bandwidth.

An electrical digital connection therefore appears to be best, but optical has attractions and again make your own comparisons if possible.

NK

CLASSIC RESPONSE

With reference to using more classical music for equipment reviews you may be interested about a little known piece of 'classical blues' which has just been re-released as a superb HD file. This is the second, central, movement of Malcolm Arnold's *Guitar Concerto* written for and played by Julian Bream



At around £400 the Audiolab Q-DAC was the cheapest ESS Sabre32 equipped DAC in the UK marketplace – and they were being sold at knock down prices to make way for a new version. Dave was delighted with its "comfortable sound".

(recorded in September 1959 at Decca Studios London). This movement is an elegy to Django and is a deliciously moody and 'finely dressed' slow blues, but in a classical style. The original LP was released in 1961. I have the 1970 RCA Red Seal re-issue. But the new HD version reveals more clarity and detail from the original master tapes. There is also a YouTube video of Bream playing the same piece at the Proms in 1991 (with Malcolm Arnold appearing at the end).

my shelves dating mainly from 2010 but with a few earlier 'specials'. These include the Peter Comeau review of my treasured Quad 77 amplifier in HFN, February 1995, and the review of the Quad 99 system in HFW, October 2005. So the Quad 77 had a ten year production run and mine is still going strong in 2015 in my 'den'.

I am currently considering a major upgrade of my garden room system to be focussed (probably) on Martin Logan Electromotion ESL speakers and



Audiolab's M-CDT CD transport should make a good companion to the company's excellent ESS Sabre DAC-equipped Q-DAC – but, as ever, an audition is recommended.

The other pieces of classical guitar music are all beautifully played and recorded and this is currently one of my favourite HD files. Even if Malcolm Arnold is not your cup of tea the Giuliani is so charming it might seduce even those who 'don't like classical'. I love hearing these old analogue recordings freshly minted in HD. It is like hearing old favourites for the first time.

Moving on in the same vein. I have about a hundred hi-fi magazines on

I have prepared a USB stick of music in various formats to take with me when I start to audition equipment. I attach a PDF list of the music on the USB stick. (I would be happy to email additional track and/or album details.) As part of this preparation I read through all the hi-fi magazine equipment reviews I have on the shelf focussing on the music used for each review. In fact I am preparing a personal database of the music used in these reviews (but that is another story).



The renowned Quad 77 integrated amplifier - one of which is still going strong in Mike Tartaglia-Kershaw's 'den' almost 20 years after its manufacture.

I read the letter from Rowland Cook (HFW Sept 2015 p42) with great interest. I agree with his comment concerning the lack of classical music mentioned in equipment reviews. I think at least a one sentence summary of the overall sound of a classical orchestra in every review would be very useful and is not a lot to ask. It also allows comparison from test to test over a range of equipment. Even if this noted, for example, 'a tendency to wiry sound on violins' or 'muddled sound on massed strings' it would be a hint of what to listen for when auditioning or matching equipment for a system.

Furthermore, where classical music is used and mentioned I am amazed that there is no mention of Tchaikovsky! Surely, apart from Bach and Vivaldi, he created a type of sound which is, to me, the most similar to a wide range of 'modern' music, in his use of bold simple melody, complexity of orchestration, and dramatic contrast. I think the music is very approachable even for those who 'don't like classical'. There are many good Tchaikovsky recordings but I selected one to head my list. This is alive concert digital recording from 2000 of Tchaikovsky's 4th Symphony by the Colorado SO conducted by Marin Alsop (Naxos CD, 8.555714). Just listening to the first few bars of each movement provides dramatic contrasts from the blare of brass in complex harmony to mass pizzicato strings. I suppose Tchaikovsky may be considered 'middle of the road' and too 'old hat' for modern reviewers who favour Stravinsky. The important point is that his music is a good test for audio equipment. It can be both 'dense' and 'sparse'. Tchaikovsky's 4th Symphony was first performed in 1878 in St Petersburg and a critic at the time stated that it possessed 'an entire palette of luxuriant musical colours'.

The attached list obviously reflects my tastes in music but the samples are

selected to test individual facets of hi-fi reproduction from powerful solid bass to high harmonics, as well as spaciousness and transparency, sound-staging, and rhythm and timing. They do not reflect the music I listen to most of the time. I do not listen to church organ music frequently but it is a good test of hi-fi equipment and I enjoy the occasional 'blast'. Whereas, I am lucky enough to have seen and heard 'Fotheringay' twice in about 1970 (they only lasted a year) and 'The Sea' is my all time favourite Sandy Denny song. This is one of the earliest environmental songs (concerning sea level rise) but the words are a clever riddle with the title as the answer

and the overall effect is like a timeless 'folk saga'. In hi-fi terms the clean analogue recording, expert instrumental playing, wonderful vocal, and occasional 'shimmer' of brushed high hats is, for me, mesmerising.

Five minutes of each track would probably suffice in a demonstration/audition. I would be interested in both your thoughts and those of other members of the team.

Best wishes,

Mike Tartaglia-Kershaw

Hi Mike. What pieces of music are used in reviews is a recurring topic in our Letters pages. Personally, I try to use as large a range of genres as possible to evaluate equipment but do have a number of 'go-to' tracks for assessing areas such as pace, timing, bass, midband, bandwidth, detail etc. Unfortunately, however, in the space of a single review it's frequently not possible to reference every piece of music listened to.

I find the terms used to describe various genres of music so wide-ranging as to be meaningless. There's a world of difference, for example, between Arvo Part, Wagner, Schoenberg's 12-tone compositions and the works of Philip Glass – yet all would come under the catch-all

Hi-Fi Demonstration Music		MTK 2015
Title	Notes	Format
Tchaikovsky 4 th Symphony, Marin Alsop, Colorado SO, Naxos CD, 8.555714.	Good digital recording of large orchestra with complex orchestration. Listen to first few minutes of each movement for wide range of instruments and textures, loud and quiet.	44-16
Jon Boyes – Hacienda CD	Brilliant flamenco recording with guitars and percussion.	44-16
Emma Shaplin – Cuor Senza Sangue	Beautiful female voice set against deep and dark male voice choir, bass and percussion	44-16
Los Angeles Guitar Quartet – Blue Echo	Four classical guitars spaced across the soundstage playing a Chet Atkins style piece with amusing left right stereo arrangement.	44-16
Fotheringay – The Sea	Good analogue recording - Sandy Denny	44-16
Dire Straits – Sultans of Swing	Good recording of basic rock group	44-16
Dire Straits – Brothers in Arms	Atmospheric recording	44-16
All Angels – Sound of Silence	Female Voices	44-16
Amici – Nimrod – Elgar	Mixed male and female voices	44-16
Orff – Carmina Burana	Large choir and percussion	44-16
Vivaldi – Four Seasons – Spring – Accardo	Sound of bows on strings – Stradivarius	44-16
Widor – Toccata	Winchester Cathedral Organ	44-16
Saint Saens – Organ Symphony	Organ and large orchestra and piano	44-16
Rachmaninov Piano Concerto 2, Andsnes, Pappano, EMI	Recording recommended by Peter Comeau for accuracy (therefore used to test Quad?)	44-16
Stravinsky - Firebird - Dorati - LSO	Good orchestral recording (1959) MLP	44-16
Strawbs LP ripped in HD	Clean analogue recording with sound of sticks on drum-skins and vocal effects.	192-24
Crosby Stills and Nash LP ripped in HD	Three famous male voices set across a wide soundstage.	192-24
Helplessly Hoping	Brilliant SACD of Clapton and King	88-24
Riding with the King SACD rip	Brilliant SACD of Clapton and King	88-24
Key to the Highway SACD rip	HD demo track	48-24
The Sad Cafe J D Souther	HD string tone	192-24
Vivaldi – Four Seasons - Summer	HD download of old analogue recording	192-24
Julian Bream – classical guitar and small orchestra	HD download of old analogue recording	192-24
Narciso Yepes- classical guitar and large orchestra	HD download of old analogue recording	192-24
Haydn String Quartet	HD demo track	192-24
Bach Violin Concerto – Anne Akiko Meyers	HD demo track	96-24
Rimsky-Korsakov – Dance of the Tumblers	HD demo track	96-24
Mahler Symphony No 1	HD demo track	DSD
Vision of Her	HD demo track	DSD

Mike Tartaglia-Kershaw's list of recommended musical pieces for auditioning new hi-fi components. He's hoping these will sound good through a pair of Martin Logan Electromotion ESL loudspeakers.

description of Classical.

Similarly The Jesus And Mary Chain's 'Psychocandy', Lou Reed's 'Metal Machine Music' and Creedence Clearwater Revival would all be branded as Rock, yet listen to them back-to-back and you'd doubt they came from the same planet – never mind are all part of the same so-called genre!

Perhaps we should instead just heed the words of Alban Berg to George Gershwin when the American songwriter felt too embarrassed to play some of his own work to the great composer and was told, "Mr Gershwin, music is music".

JM

TRANSPORTS OF DELIGHT

I am trying to track down someone able to service an old Sony Walkman Pro and a Nakamichi BX300e cassette deck. Do you have any ideas where I can start? I have been out of the hi-fi game for a while and have no idea. Kind Regards

Johnny Hickman

very least will need a good service if you're to get the best from them!

Let's start with the BX300. Lack of rewind/fast forward and poor takeup (with resultant damage to tapes) can usually be attributed to the idler that couples the drive motor to the spools. Thankfully, idlers are still available (around £5 online). However, later machines benefitted from a redesigned and longer-lasting part which is almost unobtainable today. If yours is problem-free in this area, chances are it's fitted.

BX300 heads - Nak 'specials' - can lead long lives if owners have looked after them. Cases of extreme wear aren't, however, unknown. If you're hearing a crackle, distortion or the absence of audio on one or more channels in playback and/or record, though, the heads aren't responsible. The culprits are instead certain capacitors in the electronics. Over time, they can deteriorate or even fail altogether.

These components are nearly always orange in colour, thus the

control chip might have failed; sadly, replacements are difficult to obtain nowadays.

It will almost certainly go to Silicon Heaven after being accidentally-connected to a power supply of 'inverted' DC polarity. Over the years, many WM-D6Cs have been damaged by such practice - they were heavy battery-consumers, and users were tempted to try alternative power sources. The proprietary record-playback head is very resilient but wear isn't unknown - especially if the cue/review facilities were in regular use (as a journalist's 'note-taker'?).

Equipment of this standard needs specialist treatment. But without seeing the machines, it's difficult to assess their condition and what would be required to bring them back to the manufacturer's specification. In any case, you don't list any specific ailments. Our throwaway society has alas led to the demise of the repair workshop (a problem discussed in my column last month) and I am not in a position



The Nakamichi BX300e was the first 'serious' cassette deck in their range - and very popular at the time. With three superb heads and twin-capstan transport, it made fine recordings.

These decks, as you clearly recognise, are well worth keeping. Both have been featured in Olde Worlde and are capable of excellent results. You'll be amazed at how good cassettes (including pre-recorded material) can sound when played on them. Sony's Walkman Professional is rightly considered as a classic, while the BX300 gave cassette enthusiasts a taste of the effortless Nak 3-head performance at a comparatively-affordable level.

You don't say what's functionally-wrong with your machines, what condition they are in, when they were last used or how they have been stored and maintained. They date back to the '80s and at the

term 'OCD' (orange cap disease)! Replacing these (and, at the same time, ageing electrolytics), checking/replacing the spool-idler/drive belts/pinch-rollers and giving the machine a good general service (including head/capstan cleaning and demagnetisation) will usually make a well cared-for machine as good as new.

Then there's the Sony. This is, like so much Japanese equipment of its era, very reliable. The grease used in various parts of the mechanism can harden, necessitating a time-consuming strip-down (if your machine won't take up or wind/rewind properly, this is a common cause). Does your machine play too fast? Then the motor speed-

to recommend a local repairer (assuming you can even find one!).

Unless you're very lucky, then, be prepared to ship your hardware 'out of town'. To prevent couriers from adding extra faults, ensure everything's very well-packed (cocoon the decks generously in bubble-wrap!), place 'fragile' notices on the cartons and take out extra insurance - just in case.

I am familiar with both decks and am in a position to carry out services and repairs - provided I can source any replacement parts that may be needed! My contact details (Tekktalk) are listed in the 'Classic Contacts' section at the back of this magazine. **MP**

...and then there were three

Oppo headphones get 'affordable'!
Martin Pipe dons a pair of PM-3s.

Just over a year ago, Oppo Digital – better known for its class-leading DVD and Blu-ray players – surprised us all. The Silicon Valley resident announced that it was going into the growing headphones market. The £1,100 PM-1s were a statement of intent, the phones that introduced to the world Oppo's 21st-century take on 'planar magnetic' (PM) transducer technology – the basic principles of which underpinned past 'phones from Wharfedale, Yamaha and others.

A flat and ultra-light diaphragm with embedded foil conductor sits between ring magnets. The audio signal is passed through the foil conductor making the film move in sympathy with it; it's a form of motor. A similar idea is used, albeit on a larger scale, by Magnepan in their Magneplanar loudspeakers.

Planar magnetics work exceptionally well in headphones, the circumaural PM-1s delivering a sound quality that many compared to high-end electrostatic designs. Everything about the PM-1s oozed luxury, right down to the lambskin ear cups and wooden presentation box. But all of the underlying research and computer modelling was to go further. A slightly less luxurious version, the £700 PM-2s, followed a few months later.

And so to the latest and most affordable Oppo headphones yet. At £349 the PM-3s reviewed here are themselves hardly cheap by mass-market standards. They aim higher, though. Despite selling for a third of the PM-1's price, it's good to see that a superb level of construction and finish exist: they look and feel classy.

The PM-3s are supplied in a decent carrying case with a 3.5mm-6.3mm adaptor and two sets of connecting leads (3m and 1.2m with Apple or Android 'dongle'). Yes, the lead is detachable, but the synthetic-leather ear cups are not. At 330g, the PM-3s are neither the heaviest nor the lightest of their kind.

With headband properly adjusted, these 'phones are very comfortable to wear; long-term fatigue was absent. The PM-3s couple the circumaural principle and 55mm PM driver of previous Oppos to a closed-back design. Isolation from external noise sources is, as a result, excellent.

They also sound pretty darn good I found. First of all, I tried a Cowon D20 – a little multimedia player that suffers from lack of drive. The PM-3's lowish sensitivity (102dB/1mW) did little to address this, although their closed nature ensured the music didn't struggle to be heard. Listening to various lossless tracks from Talking Heads, Can, Thomas Dolby and Boards of Canada amongst others, gave the impression of smoothness, clarity, plausible sound staging, a solid well-defined bass and a moderately-recessed high-end.

For most of my listening, though, I relied on a Benchmark DAC2 HGC DAC/headphone amp and Roksan K3 CD player. The characteristics noted above shone through; they present

a more musical alternative to the shriekingly-overpowering treble and stodgy low notes of many conventional-driver 'phones.

To this can be added impressive resolving power, deft timing and tonal articulation. As a result, Stravinsky's 'Firebird' crackled with energy and excitement.

They did, however, ruthlessly-expose the hiss that lay behind rockabilly-revivalist Imelda May's seductive vocals in the haunting 'Knock 123'. The musicians accompanying her, though, were given the depth and richness that make the track so atmospheric.

On the whole, then, the PM-3s are a credit to the Oppo brand. Smooth and rich, they sounded lovely and have a distinctive presentation.



OPPO PM-3 £349



OUTSTANDING - amongst the best.

VERDICT

A smooth alternative to the norm. Lovely.

FOR

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AGAINST

- lacking in brilliance
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Dynamic Duo!

Cambridge Audio's stylish CX series CD transport/DAC/amplifier combination matches good looks with great sound, says Jon Myles.



Cambridge Audio's research and development department must be one of the busiest in the business. It seems hardly a month goes by without the company launching a new product – be it wireless 'speakers, AV receivers, Blu-ray players, sub-woofers, amplifiers or CD players and transports.

It's no wonder the company's Central London headquarters is a hive of activity, as I found on a recent tour of the high-tech facility – which features state-of-the-art listening rooms, 3-D printers and an energetic workforce with a genuine passion for music.

That visit came shortly after I'd reviewed the impressive Cambridge

Azur 851N network player – a £1200 product good with sound quality and functionality good enough to trouble rivals costing almost twice as much.

Not content with that success, though, Cambridge now has a complete new range of digital hi-fi components available in the shape of the CX series.

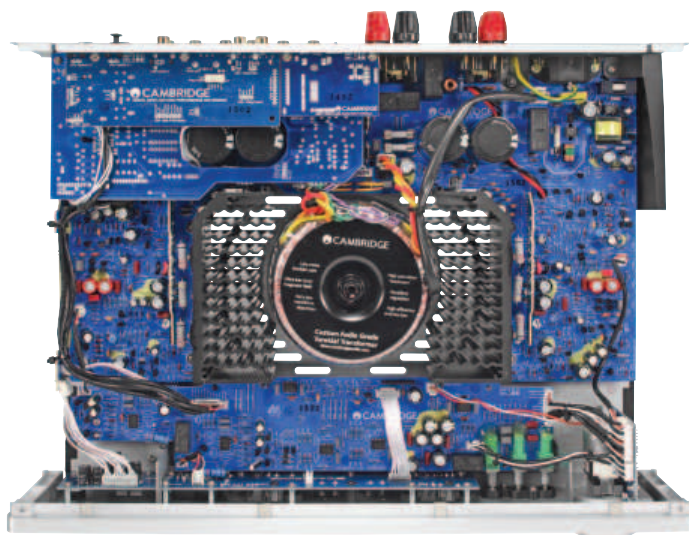
The six-strong line-up features an upsampling network player, two amplifiers with digital connectivity (60 Watts and 80 Watts per channel respectively), a dedicated CD transport and a pair of AV receivers.

They all sport a distinctive new

design with a so-called 'floating' base that instead of employing four standard feet uses an underside that inclines from the front two corners to create a plinth in the middle. It looks sleek but is not just for show – with the Cambridge design team saying it also helps to minimise resonances in the casework.

Prices range up to £2000 with the CXC CD transport and CXA80 amplifier costing £300 and £750 respectively. Build quality of both units is, as usual with Cambridge, exemplary for the price, with all controls feeling firm and solid and the fascias having a clean, modern look about them.





The Cambridge CXA80 amplifier is a dual mono design based around a toroidal transformer to give a healthy 80 Watts per channel of power output.

The simplest of the two is the CXC which is purposed for one task only – reading standard Red Book CDs (no SACD capability) and outputting the digital signal. It uses a traditional sled-type tray that, although plastic, is relatively sturdy for the price. Below it is a good-sized display for track number, elapsed time etc.

Inside, Cambridge has fitted its proprietary S3 servo mechanism as used in the brand's flagship Azur 851C silver disc spinner. On the back are the digital outputs – one S/PDIF co-axial and one Toslink optical.

The CXA80 is, not surprisingly,

bit/192kHz.

Analogue connections are made via one set of balanced XLRs and four unbalanced RCAs, while digital inputs consist of a single S/PDIF

purchase of a £70 BT dongle.

Other features include both subwoofer and pre-out connections as well as twin sets of loudspeaker outputs to make bi-wiring easy.

Despite the wealth of connection options, the CXA80 is easy to operate. The front of the unit features individual buttons for selecting each of the analogue or digital inputs, an A/B 'speaker output switch as well as the volume control and a headphone jack. Alternatively all the functions can be accessed via the supplied system remote.

Of course, the CXC and CXA80 can be used independently if you already have a CD player and other digital sources to feed into the amplifier or a good DAC to connect to the Cambridge CD transport – but in the context of the CX series it seemed sensible to audition them together.

SOUND QUALITY

Connecting the CXC and CXA80 together via a high-quality Chord Indigo coaxial cable and slotting



On the rear of the CXA80 twin speaker outputs are joined by a full set of analogue and digital inputs.

"the CXA80 brings real depth to the bass but keeps it taut and punchy so the track never loses any of its speed"

a rather more complex beast. It's an 80 Watts per channel Class A/B amplifier with a DAC section built around Wolfson's WM8740 chip that can handle files of up to 24-

coaxial, two Toslink optical and a type-B USB. There's also a 3.5mm front panel jack for connecting the line-out of a portable player and the ability to add Bluetooth with the

Bruce Springsteen's 'Born To Run' into the player I quickly realise the Cambridge combination is a lively performer.

Traditionally the company's products have trod a relatively safe path with a fairly neutral tonal balance but this pairing seems a little more forward and upfront.

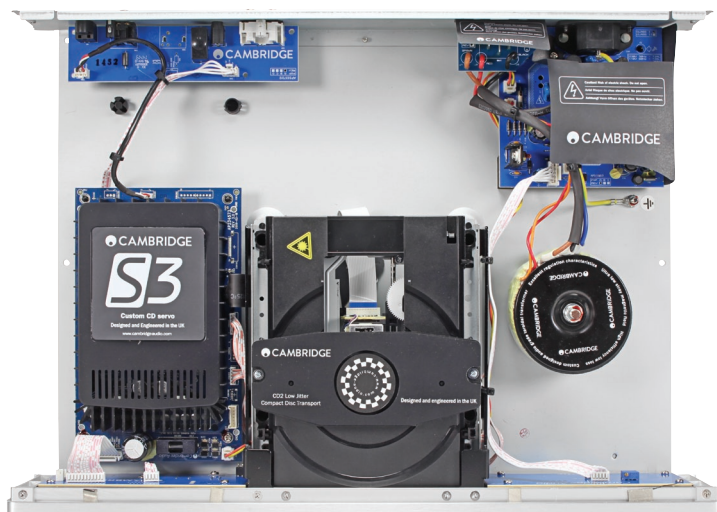
There's a good crunch to the guitar riff on 'She's The One' while Clarence Clemons saxophone has real bite to it.

Switching to The Chemical Brothers' 'Song To The Siren' and the CXA80 brings real depth to the bass but keeps it taut and punchy so the track never loses any of its speed.

All this translates into a really energetic performance that can't help but get your toes tapping.



The rear of the CXC transport includes S/PDIF coaxial and Toslink optical digital outputs.



The CXC CD transport uses Cambridge's proprietary S3 servo mechanism which the company claims gives minimal jitter and excellent error correction.

Thankfully, though, it's not done at the expense of detail or rhythmic authority.

Moving away from the CXD and feeding the CXA80 some high-resolution files shows its well capable translating the extra information on offer into increased musical enjoyment. There's plenty of space around the myriad instruments in the complex arrangements on Daft Punk's 'Random Access Memories', with Giorgio Moroder's voice sounding especially resonant on his spoken monologue.

There's was also force in the closing crescendo of the final track 'Contact', the Cambridge capturing the raw power of the drum salvo superbly. However, the DAC isn't the smoothest available with a slight edge and lack of smoothness to the overall sound.

Cambridge say they chose the WM8740 chipset because they think it is one of the best-sounding available – despite the fact there are some more recent Wolfson DACs on the market.

And while the digital side of the CXA80 does a decent job, it doesn't have the naturalness, outright dynamic range or free-flowing quality of some rivals equipped with something like an ESS Sabre chipset.

By-passing the CXA80's internal DAC by running the CXC into a Chord 2Qute DAC (see review elsewhere in these pages) brought more insight and clarity to the sound – with much more detail and better propulsive drive. Admittedly, the

Chord is a dedicated DAC costing £250 more than the CXA80 so perhaps that's not really surprising.

But this combination did highlight just how good the CXC transport

and amplifier section of the CXA80 are. Playing the drum/bass/harmonies of ESG's 'South Bronx Story' via the trio and the rhythmic pulse was spot-on with the Scroggins sisters' vocals sounding exceptionally sweet.

Having said that, the Cambridge CXC/CXA80 is still a very good package when you take into account it costs just a shade over £1000. Add a decent pair of loudspeakers (I'm thinking of Cambridge's own Aeromax 2 standmounts at £450 or for something with a bit more low-end authority Epos K3 floorstanders at £999) and you'll have an excellent all-round system for £2000 or less. Who says good hi-fi has to be expensive?

CONCLUSION

The CXC/CXA80 combination can only enhance Cambridge Audio's reputation for producing components offering some of the best sound-per-pound value out there.

The CXC transport does its job well and could easily stand partnering with some much more expensive off-board DACs while the

MEASURED PERFORMANCE

The CXA80 produced 90 Watts into an 8 Ohm load and 132 Watts into a 4 Ohm load, so it has plenty of power to go very loud in any room.

Distortion figures were low all round, measuring typically 0.002% in the midband for example. At 10kHz, 1 Watt output into 4 Ohms, a revealing tests of crossover distortion, the A80

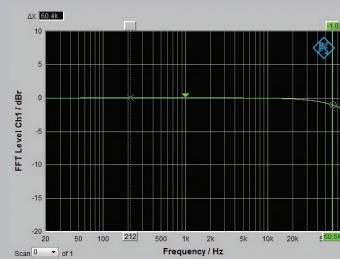
managed very well, returning a distortion figure of 0.01%, most of which was third harmonic our analysis shows.

Input sensitivity was low at 400mV via the unbalanced (phono socket) line inputs, and very low through the balanced XLR line inputs at 800mV, if still suitable for a CD player XLR output delivering 4V.

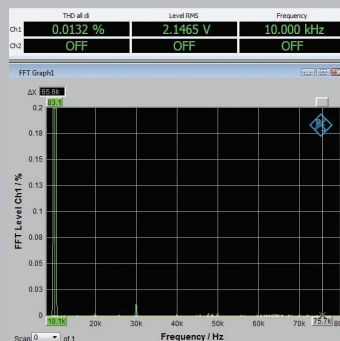
The digital input worked to 192kHz sample rate, having an analogue bandwidth that reached 40kHz before rolling way to the upper limit of 96kHz. Distortion with CD (16/44.1) was normal enough at 0.22%, mostly 16bit quantisation noise, but with 24bit a figure of 0.16% was surprisingly poor; nowadays budget DACs manage 0.05-0.1% or thereabouts. Unsurprisingly, EIAJ Dynamic Range was a low 103dB, giving hi-res music files the same DR as CD files – unimpressive.

The CXA80 amplifier measures very well but the digital inputs were disappointing. **NK**

FREQUENCY RESPONSE



DISTORTION



Power	90 Watts
Frequency response	5Hz-60kHz
Separation	111dB
Noise	-107dB
Distortion	0.01%
Sensitivity	400mV
Damping factor	40

CAMBRIDGE CXC/ CXA80 £300/£750



EXCELLENT - extremely capable.

VERDICT

A good value CD transport/DAC/amplifier package which offers excellent value for money. The DAC section could be better though.

FOR

- energetic sound
- great timing
- good connectivity
- excellent build

AGAINST

- DAC section could be better
- Bluetooth dongle not included

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Art Dudley Stereophile 2015

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Alan Sircom HiFi Plus 2014

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AC/HFW/87

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AC/HFW/85

Into the matrix

Martin Pipe discovers how the LP was repurposed as a backwards-compatible carrier of four-channel music.

Last month, I examined the first 'matrix' systems – intended to squeeze four channels of sound onto the grooves of a vinyl record, able to play with acceptable results in mono, stereo and quad systems alike. This scheme would, in theory, improve the uptake of quad software. Consumers were expected to buy and enjoy the discs even if they didn't have quad systems, deriving the full benefit after upgrading their audio equipment to four-channel playback. However, early entrants like Dynaco and ElectroVoice simply didn't have the market clout. There were also concerns with performance.

The first company to launch an improved matrix system based around the ideas of inventor Peter Schreiber was Sansui in Japan. Its system, 'regular matrix', was branded as QS (which stood for 'Quadraphonic Synthesiser'). The first QS product was the QS-I decoder, designed to integrate with existing stereo hardware. As well as four cool-looking meters that indicated the level of each channel, the QSD-I featured a mode for synthesising four-channel surround from stereo records. Just as well, as it took a while for QS records to appear.

Developed by engineer Isao Itoh, Regular Matrix (RM) became a Japanese industry standard following its 1971 introduction – thus the 'RM' decoding feature of most Japanese quad gear from that period. Using the terminology introduced last month, the encoded QS left channel contained a mix of the original four-channel source's left (FL) playback channel (a 0.92 proportion, or 92%), front-right channel (FR; 0.38), rear-left (RL; 0.92, with +90 degree phase shift) and rear-right (RR; 0.38, with +90 degree phase shift).

The signal presented to the right-channel of the cutting-head by a QS surround-encoded signal, meanwhile, contained the four channels in the following relative proportions: FL,



The 1973-vintage SQD-2020, which incorporated front-back and 'wave-matching' logic techniques to improve separation, was Sony's top-of-the-line 'add-on' SQ decoder for UK sale.

0.38; FR, 0.92; RL, 0.38 (with -90-degree phase shift); RR, 0.92 (with -90-degree phase shift). The relative proportions are different to those of the earlier technologies but the main innovation was the introduction of opposing phase shifts to embed rear-channel information. Delineation between channels would thus improve, in theory at least. Note, however, that the mixing between channels ensured that the front-channel left/right soundstage would be 'compressed' relative to a 'normal' stereo version.

Despite this, QS was claimed to offer good stereo compatibility and – thanks to the symmetry of its channel mix – a more uniform and consistent performance. As it stood, though, channel separation between the four channels using a basic decoder was a mere 3dB. This was, as we'll see, later addressed by technology. QS generated interest from a dozen or so record companies – including Pye, Decca, MCA and ABC. Sansui freely-licensed the encoding technology to them, which obviously encouraged take-up. Sansui was the biggest QS hardware backer with a range of quad receivers and 'add-on' decoders, but most competing equipment had some kind of compatible RM mode too.

Then came the similar (but different enough to be incompatible!) Stereo-Quadraphonic – 'SQ' – format that was developed by the CBS

Technology Center in the US. Much of the work was done there by an engineer called Ben Bauer. The Sony name is also associated with SQ, presumably because it put a lot of effort into developing and selling decoders. For SQ, the matrix was configured as follows: encoded left channel, 1.0 FL + 0.0 FR + 0.7 RL (with -90 degree phase-shift) + 0.7 RR; encoded right channel, 0.0 FL + 1.0 FR + 0.7 RL + 0.7 RR (with +90 degree phase-shift). This gave less than optimal results on mono players, so the matrix was subsequently



Different formats meant different names. CD-4 (which we'll meet next month) was also known as 'Quadradisc'. And Pye labelled its QS-encoded releases '4D Sound'.

modified by reconfiguring the phase-shifts applied to the rear channels.

In the UK, EMI was the key backer of SQ. But other labels

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Choice

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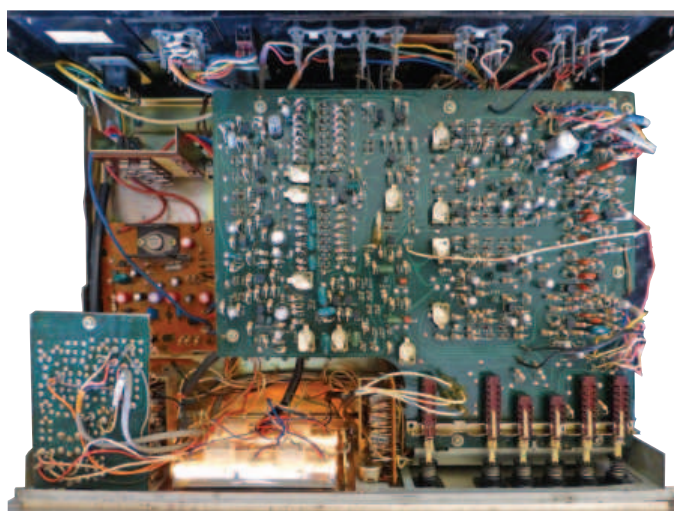
distributing SQ product included Epic, Harvest, Supraphon CBS (Columbia in the UK). The total number of software backers was around the same number as those lending their support to QS, although a 1974 US catalogue listed 128 QS releases against 389 LPs encoded in SQ.

The general consensus is that QS gave better quad, while SQ yielded better stereo compatibility (note the SQ matrix's lack of blending between the front left and right channels). As a result, SQ was more likely to result in 'single inventory' - something that presumably led to the above statistic. In 1976 and 1977, for example, all

advantages).

Most of the expensive 'bells-and-whistles' quad receivers from the era's better-known manufacturers - Technics/Panasonic, Pioneer, Harman-Kardon, Akai, Marantz and Fisher - had an SQ mode, and Sony sold a number of different SQ-compatible products. Its lines included budget quadraphonic record players and a number of decoders for upgrading stereo systems.

Sony's highest-end SQ decoder was the SQD-2020. In addition to its four channel-level meters, the SQD-2020 featured an early form of a technology called 'logic



Inside the Sony SQD-2020 SQ decoder. One of the reasons for that internal complexity is its reliance on discrete components.

Columbia/Masterworks LPs were released in a SQ 'compatible quad' form that served both stereo and quad markets (this cost-effectiveness was one of matrix quad's key claimed

enhancement' to get around the problems suffered by SQ (and, for that matter, QS). These included poor separation and the inability to differentiate between the front-centre image and the rear-centre image. Recording engineers had to mix albums destined for matrix formats in such a way that their limitations were circumvented as far as was possible. Logic enhancement applied some simple rules. 'Variable-blend' logic, for example, cancelled out the leakage between front and rear. 'Wave-matching logic' (also called 'gain riding') improved the separation between individual channels.

Control over signal levels was carried out instantaneously using voltage-controlled amplifiers (VCAs) driven by the level-detectors of the logic circuitry. Logic processing fulfilled its objective, insofar that front-rear separation was increased from 3dB to a near-discrete 20dB (or more). Unfortunately, the action of the VCAs usually resulted in a noticeable 'pumping' effect; this was

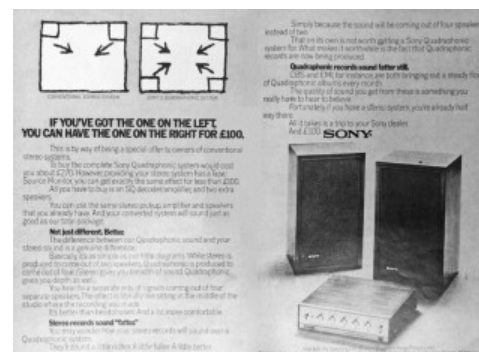


Sansui, developer of the QS matrix format and manufacturer of some classic receivers regularly advertised in the hi-fi press. Here, the firm is drawing attention to an early generation of QS-ready quadware.

certainly true of the SQD-2020 if you played an SQ album immersed in quad imagery – like jazz-rock band Chase's eponymous effort. The technology involved a certain amount of 'guesswork', and a logic-decoded matrix LP would sound very different to the Q8 (i.e. discrete quad 8-track) version! But then again, there would almost certainly have been differences in the mixes.

The internally-busy SQ-2020 implemented its complex decoding with discrete transistor circuitry; there wasn't a chip in sight! Not long thereafter, CBS and Motorola developed 'full logic' SQ decoder chipsets of improved performance. These were licensed to equipment manufacturers. More sophisticated QS decoders of better performance were also introduced. Sansui's, known as Variomatrix, first saw the light of day in 1973. Initially at least, receivers and decoders from specific manufacturers tended to be optimised for only one of the matrix formats; basic decoding circuitry (and thus inferior results) was provided for the other one. You could get some kind of surround effect from a QS disc with a SQ decoder (and vice versa) but it was obviously 'false'. The Variomatrix circuitry fitted to Sansui four-channel receivers reputedly did a better job with SQ than lesser QS decoders, though.

Next month, we explore quadraphonic broadcasting and discrete four-channel records



Sony launched its SQA-200 – a basic decoder with front-back logic and 2x 8-watt rear-channel amplification – plus a pair of matching speakers. The package's total cost was £100, admittedly a fair wedge back in '73...



Quad LPs weren't particularly easy to come by – but some specialist retailers such as The Quadraphonic Record Centre in Earls Court filled the gap in the market.

Qute Operator



Chord Electronic's new 2Qute DAC sounds even better than it looks, says Jon Myles.

A company has to have supreme confidence in its abilities when it allows one of its flagship products to share the same name as a popular TV comedy channel. But so it is with Chord – who earlier this year raised a few eyebrows by naming its state-of-the-art £8000 DAC Dave.

Mind you, the Kent-based outfit seems to have taken a particular delight recently in giving its products slightly off-the-wall names. At one time it was content with technical-sounding monikers such as QBD76HD or DSX1000 – but lately its DAC line-up has consisted of

products bearing titles such as Chordette, Hugo, Qute EX and the aforementioned Dave.

And now there's the Qute EX's successor in the shape of the 2Qute (see what they've done there again?).

To be fair, it's quite an apt epithet as the product in question is undeniably small, shapely and, well, cute. In typical Chord fashion the new standalone DAC is housed in a gorgeous machined aluminium chassis measuring 160mm x 70mm x 40mm (W/H/D) with curved edges and an illuminated round window on the top allows you to see a section of the neatly laid-out internal electronics as well as acting as an indicator of incoming sample rate (more of which later).

Inside the 2Qute employs technology derived from Chord's more expensive Hugo DAC. So instead of the off-the-shelf digital decoding circuits used by most other manufacturers you get the latest Spartan 6 version of the company's proprietary Field Programmable Gate Array technology with 26,368 digital taps – which the company claims

contributes to better detail retrieval and musical transparency.

On the rear, BNC coaxial and USB type-B inputs can accept high-resolution files all the way up to 32-bit/384kHz while an optical input operates up to 24-bit/192kHz. All three will also play DSD64 files while DSD128 can be played via the USB and coaxial. As usual the USB input is plug-and-play for Apple and Android devices while Windows users will need to install the supplied driver to get their machines running with the 2Qute.

A simple connector switch toggles between the three connections and a single pair of line-level RCA outputs provide connection to the hi-fi.

Incoming sample rate is indicated by the colour shown in the illuminated window on the top of the chassis. For example, on 44.1kHz files the window glows red while green indicates 96kHz, purple 192kHz and so on. It looks fantastic in use but you'll probably find yourself referring to the instruction manual on a regular basis at first until you memorise the various colour codes.

The round window on the Chord's fascia changes colour to show incoming sample rate. Green indicates a 24bit/96kHz rate.





On the rear of the 2Qute are coaxial, optical and USB type B digital connections as well as RCA analogue out sockets.

SOUND QUALITY

Clean, accurate and tremendously detailed were my first impressions when hooking up the 2Qute. This is a DAC that goes about its business with almost forensic precision.

Connected to the excellent Creek Evolution 100A integrated amplifier and fed Leftfield's 'Phat Planet' in plain 16-bit/44.1kHz it was immediately obvious the Chord has a crisp, robust sound with a talent for digging deep into the heart of the music.

This is a deceptively simple track on first listen but there's actually a lot going on throughout the piece. Through the Chord, though, it was easy to pick out the various samples and electronic trickery even when these elements were buried way back in the mix. Bass was firm and well-rounded with good depth while the Chord seems to have a slightly forward nature which emphasises the speed of the piece.

In fact, there was a natural dynamism to the overall sound – probably down to the fact that the 2Qute manages to start and stop notes on a sixpence, leading edges having pinpoint precision and timing.

Playing The Smiths' 'How Soon Is Now' (24/96) Johnny Marr's guitar work was laid out on a palette in all its studio-engineered glory. The Chord made it clear there were four amps being used on the rippling tremolo effect at the start of the song, where some other DACs can reduce the effect to more of a reverberation-soaked drone.

It's a level of clean, clear detail that makes the Chord the ideal DAC for those who really like to hear well into the detail of various pieces of music.

Switching to DSD via a MacBook Air connected into the USB input

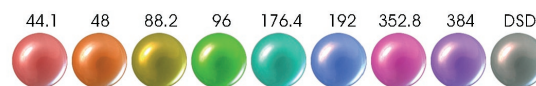
that quality worked wonders with the San Francisco Symphony's 'Mahler No 2'. Here every element of the orchestra was spread

in front of me in an immense sound stage – yet every note, cymbal strike and string could be easily delineated.

This level of clarity does mean the 2Qute can sound a little harsh on poor recordings. Feed it some heavily-processed pop and you'll soon know about the production's shortcomings.

But switch to a decent recording such as Miles Davis's classic 'Kind Of Blue' and it has the ability to transport you to the studio with Davis's trumpet and Coltrane's saxophone ringing clean and true while the rhythm section possesses a natural, organic flow.

In fact, with high-definition recordings there's a sense that the 2Qute doesn't really have any character of its own at all but is merely letting the music flow through it completely unsullied.



CONCLUSION

The Chord 2Qute is a massively detailed DAC with the ability to get to the heart of any recording. It isn't dark, creamy or artificially rich in any of the frequency spectrum but instead majors on presenting your music files as accurately as possible. As such it demands good quality ancillaries and, ideally, high-quality recordings to give of its best. But supply it with those and the 2Qute will bring you as close to your music as it's possible to get in a £1000 DAC.

Here are the colours displayed through the 2Qute's glass window, and their related sample rates.



The Chord's window glows red to indicate a standard 16bit/44.1kHz incoming CD signal.

MEASURED PERFORMANCE

Frequency response measured flat to 36kHz with 192kHz sample rate digital via electrical S/PDIF input (BNC), our analysis shows, with a slow roll off in output to the 96kHz upper limit. The optical S/PDIF input (TOSLINK) worked to 192kHz too, with a good optical cable. So the Chord well exploits high sample

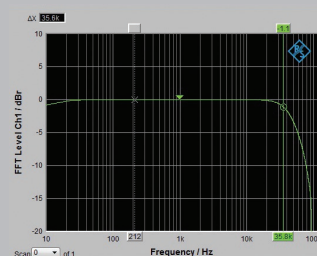
rate digital.

Distortion at full output (3V) measured a very low 0.0003% and at -60dB a low 0.02% our analysis shows, with 24bit resolution digital. Partly as a result, the measured EIAJ Dynamic Range came out at a very high 121dB, which is up with the best DACs on the market; anything above 120dB is currently top tier.

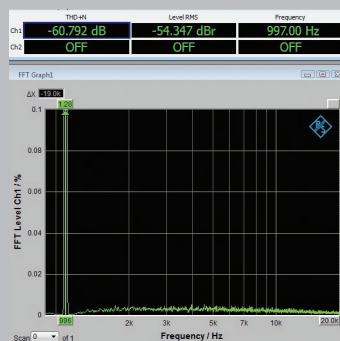
The USB input works up to 384kHz sample rate and successfully passed a 384kHz test signal, although frequency response was no wider than that recorded for a 192kHz signal. Measured dynamic range was again a high 121dB so there is no degradation here and all other figures were identical to S/PDIF.

The Chord 2Qute DAC measured very well in all areas. It has a high 3V output and a high dynamic range value, suggesting exceptional sound quality. **NK**

FREQUENCY RESPONSE



DISTORTION



Frequency response (-1dB)	4Hz-36kHz
CD	
Distortion (%)	
0dB	0.0003
-60dB	0.02
Separation (1kHz)	114dB
Noise (IEC A)	-120dB
Dynamic range (EIAJ)	121dB
Output	3V

CHORD 2QUTE £995



OUTSTANDING - amongst the best

VALUE - keenly priced

VERDICT

Stunning-looking and built DAC that marries accuracy and forensic insight to great timing and drive. Really comes into its own with high-resolution material.

FOR

- detail and timing
- weighty sound
- great build quality

AGAINST

- doesn't flatter poor recordings

Chord Electronics
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Great Small Spendor

Spendor's new D1 is its latest take on the classic mini-monitor loudspeaker. Jon Myles puts them through their paces.

Small standmount/bookshelf loudspeakers have become something of a mainstay of the UK hi-fi market – and it's not hard to see why. They generally tend to image well, while their compact

dimensions make it easier to control cabinet resonances than in larger floorstanders. Of course, they fit well domestically and are also sonically suited to our often smaller living spaces.

No wonder, then, that the

traditional two-way mini-monitor is one of the most hotly-contested product categories there is. It's also one where the venerable Spendor brand has enjoyed considerable success over the years – going right back to the iconic BBC LS3/5A of the

1970s and continuing through to its own well-regarded SA1.

But no loudspeaker manufacturer survives by standing still so the company has now unveiled the £1795 D1 as the spiritual successor to the previous two designs.

Sharing similar dimensions to the BBC LS3/5A at 305mm x 165mm x 190mm (H/W/D) at first glance the new D1 looks a pretty standard example of the classic two-way standmount – albeit an exceptionally well-finished one. But look behind the immaculately veneered glossy cabinet and there's some seriously sophisticated engineering at work.

Most obvious is the use of Spendor's new D-series drivers – and especially the 22mm Linear Pressure Zone (LPZ) tweeter. This proprietary design uses a micro-perforated stainless steel mesh cover with a polyamide fabric foil behind it. The cover and foil act as an acoustic load for the tweeter diaphragm, mechanically and acoustically balancing the load in front of and behind the tweeter. This creates symmetrical pressure on both faces of the diaphragm so it always operates in a balanced linear mode.

Allied to this is a new 150mm mid/bass driver constructed from Spendor's latest EP77 polymer material which was first developed for the larger D7 floorstander.

Unusually for a modern loudspeaker of this size these days – and harking back to the LS3/5A – the D1 is also an infinite baffle design with no bass reflex port, meaning they can be used close to rear walls or sat at either ends of a bookshelf.

The cabinet itself features asymmetric bracing, as well as Spendor's dynamic damping which uses polymer at critical internal points to convert energy into heat instead of allowing it to transmit resonances to the structure.

The rear features a single pair of high-quality 'speaker posts' – so bi-wiring is out – and an optional pair of low-mass stands are also available for an extra £595 (see panel for further details).

SOUND QUALITY

Compared to the artificially inflated bass response of many loudspeakers of this size the D1s can sound a little, well, underwhelming at first.

But take some time to adjust and things start to snap into focus. For while the small size of the box restricts the low end, in all other

areas the Spondors are tremendously communicative.

Play Little Dragon's 'Ritual Union' there was an infectious bounce to the music, with great timing and expression. The electronic rhythm track was driven along with verve and the Spondors threw out a larger-than-average soundstage considering their size.

Images are placed wide left and right of the 'speaker cabinets with good depth and height, meaning music takes on a real sense of three-dimensionality.

Bass drums have great thwack if not perhaps outright extension while vocals are intimate with good texture and presence.

Here the new LPZ tweeter comes into its own. It's not quite as razor-sharp as some ribbon designs but nor is it harsh or edgy, sounding remarkably refined with the sort of definition usually only found on more expensive designs.

Play Arvo Part's 'Spiegel Im Spiegel' I was struck by how much air and space there is around the violin part. The piano also has body

"the electronic rhythm track was driven along with verve and the Spondors threw out a larger-than-average sound-stage considering their size"

and timbre and there was seamless integration between the mid/bass unit and the tweeter. There was no sense of listening to two separate drive units.

Moving the 'speakers close to a rear wall helped bring a little more depth to the bass without losing any of the D1's seamless sound – and the Spondors have been engineered to be used this way.

Pushing volume up I found they're happy to go loud enough to fill a medium-sized room without collapsing in on themselves through apparent strain – although inevitably there is a slight sense of compression on more complex pieces.



Spendor's new Linear Pressure Zone tweeter uses a steel mesh cover with a fabric foil to equalise pressure on each side of the diaphragm, giving a more linear response.

The D1s do need a decently powerful amplifier to give their best (see Measured Performance for more details) due to their low sensitivity. I used them on the end of the beefy McIntosh MC152 with all of its 150 Watts per channel for most of the review.

But switching to the lower powered Class A Sugden FBA-800 saw image size and outright volume diminish somewhat.

Partnered well, though, and

without any expectations of club-like levels of bass, the little D1s do reward with a splendidly smooth and clean performance.

Playing the Dave Brubeck Quartet's 'Take Five' at the end of my final listening session proved just what the Spondors are all about – syncopation was spot-on, the D1s nailing the unusual time signature; drums were both fast and detailed while the saxophone soared into the room with real bite but without any edginess or unnatural zing to it.

Yes, I might have liked a little more depth to the bass but everything was so good it really didn't seem to matter.

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Clearaudio Basic Symmetry Phono Stage REDUCED	used	399	Audio Project op60 integrated	dem	Call	Burmester 061 CD player, excellent boxed	used	3249	B&W DM1mt boxed, excellent	used	299
Conrad Johnson Premier Six phono preamplifier	used	Call	Audio Research Ref 610 Monoblocks, vgc boxed	used	14299	Cambridge Audio Stream Magic	used	349	B&W DM602s3, vgc+	used	249
Garrard 401, Jelco 750 12" arm, new plinth and lid	used	1199	Audio Research D240 Power, excellent boxed	used	749	Chapter Audio Sonnet CD & Nevo remote	dem	1999	B&W 803 Matrix Series 2, vgc boxed	used	999
Graham Phantom Supreme, SME cut	dem	2749	Audio Research SP9 Preamplifier, VGC+, MM phono	used	749	Chord 'One' CD player	dem	1799	Davone Ray, vgc in walnut, great!	used	1999
Graham Phantom Supreme 12", SME cut	dem	3249	Audiobal 8000Q/Ms, silver, excellent boxed	used	899	Chord Qute EX DAC, excellent boxed	dem	799	Dynaudio Audience 52, vgc	used	199
Graham Slee Fanfare Gramamp 3	used	179	Audiobal 8000Ms, UK versions, vgc	used	499	Chord DAC 64 mk2, excellent boxed	used	899	Edwards Audio Apprentice, excellent boxed	used	299
Hadcock 242 Export, boxed	dem	599	Audiobal 8200A vgc boxed	dem	499	Consonance CD2.2, new sealed	new	Call	Eminent Technology LFT8, some marks	used	499
Inspire 'Full on' Technics 1210/Plinth/PSU/SME M2 arm	used	1899	Audio Research D240 Power, excellent boxed	dem	499	Creek Destiny Integrated CD player, boxed	dem	699	Ferguson Hill FH007&8 'desktop' audio set boxed	used	349
Linn Sodek, Heed PSU, vgc boxed	used	749	Auralic Taurus Preamplifier, excellent boxed	used	1149	Creek Destiny Integrated CD player, boxed	used	399	Final 400 Electrostatics with ES400 Sub	dem	999
Linn Sodek, Ittok, boxed new lid	used	999	BAT VK50se preamplifier, vgc+	used	2499	Cyrus C08, boxed remote	used	299	Focal Electro 1008, mint boxed	dem	2249
Linn Sodek LP12, Khan, Rubicon, Ittok, excellent	used	2249	Bel Canto C5i integrated Amp/DAC, boxed excellent	used	799	Cyrus C07Q chip, vgc+	used	279	Focal Electro 1028, mint boxed	dem	2749
Linn Sodek LP12, Khan, Rubicon, Ittok, Armageddon	used	2749	Bryston B100sst excellent boxed	used	2249	Cyrus C06 se2 boxed with remote	used	449	Gallo Nucleus Reference 2, rare, superb & boxed	used	1999
Linn Sodek, Grace 707, basik psu, VGC+	used	599	Cayin MT 34L Valve Integrated, excellent boxed	used	499	Denon DNP720AE, near mint boxed	used	199	Heco Celan 500 in Silver	dem	499
Linn Ittok LV11, excellent boxed	used	599	Chapter Audio Couplet Power Amplifier	dem	1999	EAR Acute 3, mint boxed	dem	3749	Heco Celan 300 in Mahogany	dem	399
Linn Basik Plus, vgc+	used	149	Chord Electronics CPM2650 Integrated, ex boxed	used	2499	Esoteric X035e, near mint boxed	used	1999	Heco Statement in gloss black, £3k new	dem	1499
Logic DM101 c/w Alphason HR100s and MC15 super	used	749	Consonance Cyber 10 Integrated	dem	799	Goldenote Koola, near mint boxed	used	759	Kef Q100, brand new, sealed box	new	2499
Lyra Erodion Step up	used	1499	Consonance Cyber 211 monos c/w Pavane valves	dem	2999	Kelvin Labs DAC, rare	used	199	Kef LS50, excellent boxed	used	649
Lyra Skala, excellent boxed	used	2249	Creek OBH21, excellent	used	119	Krell Reference DAC64 and PSU	used	999	Kef Reference Three-Two, vgc+	used	999
Michell Gyro Export, SME 309, QC PSU, boxed	used	1599	Cyrus Power, vgc+	used	199	Leema Elements CD player sealed box	new	749	Kudos C10, boxed vgc and cheap	used	999
Michell Technoarm A in black as new mint boxed	used	449	Cyrus XPower, excellent boxed	used	599	Linn Majik CD, just factory serviced, excellent!	used	749	Leema Xandia Mk1 in black	new	2499
Michell Synco/RB250/Ercoia, great condition	used	499	Danzel NH81088, excellent £20+k new	used	7999	Linn Karik 3, excellent boxed remote	used	499	Magneplanar MG1.7 mint boxed	dem	1799
Michell Hydraulic Ref c/w Fluid arm, superb	used	999	Decware Mini Torii Amplifier	used	799	Linn Sneaky Music, unopened	used	599	Mark & Daniel Mini in Grey inc. Marble cabinets.	dem	699
Moth phono stage	dem	249	Denon PMA1500AE, excellent	used	749	Marantz CD6003, excellent boxed	used	149	Martin Logan Quests, superb sound, reduced	used	1299
Musical Fidelity XLP5V8 phono stage	dem	199	Esoteric C03X, ex demo boxed, superb	used	5499	Marantz CD17, remote, excellent	used	399	Martin Logan Motion 15 bookshelf as new	dem	549
Musical Fidelity XLP5 phono stage, due in	used	149	Esoteric A03, ex demo boxed	used	4499	Marantz CD63Ki, remote, boxed excellent	used	149	Martin Logan Prodigy, excellent	used	3499
NAIM Aro, excellent boxed	used	1499	Esoteric C03/A03, pre/power ex demo boxed	dem	8999	Meridian 506/20 with MSR	used	399	Martin Logan Summit X, ex demo	dem	8999
NAIM Stageline N vgc	used	179	Graaf GM100 valve power amp	dem	2999	Meridian 608, msr boxed, silver or black in stock	used	1199	Martin Logan Vantage	used	2249
Oracle Delphi, Zeta, due in	used	999	Joida Envoy 211 Monoblocks, £7k new, superb, vgc	used	1999	Meridian 500 Transport, excellent boxed	used	599	Mission 782se nr mint boxed	used	199
Project PhonoBox phono stage, great entry level MM/MC phono	used	79	Krell KAV400xi, with remote	used	1199	Meridian 602/606 combo with remote	used	799	Mission Freedom 5, vgc in Rosewood	used	399
Project PhonoBox SE phono stage, excellent value	used	99	Krell KAV2250, 2 x 250w stereo power	used	1999	Meridian 500/563 with MSR excellent	used	499	Mission 752, rosewood excellent	used	179
Project RPM 10 turntable with arm and platform	dem	849	Krell KRC3 & FPB200 pre/power combo	used	2799	Micromega CD30, excellent boxed	used	499	Monitor Audio Bx2, brand new	new	179
Project Tube Box DS, excellent boxed,	used	299	Lavardin C62/API150 pre/power and interconnects	used	5499	Micromega MyDac, excellent boxed	used	179	Monitor Audio GX300, ebony near mint boxed	new	1999
Project Xpression mk2, arm and cart	used	199	Leoma Hydra 2, vgc+ boxed	used	1899	Micromega Leader, remote	used	99	Monitor Audio BX5, nr mint boxed	dem	349
Project RPM 4 Turntable/Arm with cover, great!	used	249	Leoma Tucana 2, excellent	dem	1899	Moon Eclipse CD/DAC c/w PSU, near mint boxed	used	2399	Monitor Audio Studio 50, vgc boxed	used	899
Project Perspective, Speedbox SE, Shure V15Mx	used	599	LFD L51 line stage, reasonable shape	used	299	Musical Fidelity KW SACD, new laser, upgraded ps	used	1249	Monopulse Model S	new	699
Project PhonoBox S, excellent	used	99	Linn Majik integrated, excellent bargain	used	199	Musical Fidelity M1 DAC, excellent boxed	used	329	Monopulse Model A speakers	new	1499
Rega RP1, excellent boxed	used	179	Marantz SM7, great retro power	used	899	Musical Fidelity M1 CDTB	dem	499	Monopulse Model C	new	399
Rega RP1, RSD limited edition excellent boxed	dem	189	McIntosh C22 & MC275 Commemoratives, boxed	used	6999	Musical Fidelity M3 black boxed	dem	499	Musical Fidelity MC6 Floorstanders, boxed vgc+	used	Call
Rega RP3/Elys 2, excellent boxed	dem	449	Meridian 605 Monoblocks	used	599	Musical Fidelity Nu Vista 3D CD player boxed	used	899	NAIM Ovator S400, excellent	dem	Call
Roksan TMS 2 with Reference PSU, boxed as new	used	2899	Meridian 502 preamplifier with MSR, excellent	used	499	Musical Fidelity A308 CD,	used	649	NAIM SBL, vgc+	used	699
SME 309 in black/gold print	used	749	Meridian 501 preamplifier, excellent	used	299	Musical Fidelity M1Clic	used	599	NAIM SBL mk2, vgc+	used	999
SME 3009 improved, vgc+	used	249	Meridian 501V preamp, excellent	dem	299	Musical Fidelity XDac, excellent	used	199	Nola KO speakers in black	dem	3999
SME 3009/3, excellent boxed	used	1499	Micromega IA100, great integrated, boxed	used	599	Myrryd Z20DAC, excellent boxed	used	199	Nola Micro Grand Reference inc stands, £15k new	dem	5995
SME V, excellent, boxed, due in	used	2999	Moon W7RS, excellent	used	4499	NAIM DAC, nr mint boxed	dem	1499	Paradigm Studio 10, excellent boxed	used	299
SME V12, nr mint boxed	used	549	Musical Fidelity M3i, excellent boxed, REDUCED	used	549	NAIM CD53, excellent boxed, remote	used	1899	PMC PB11, boxed, best walnut finish	used	3249
Technics SL110 c/w SME 3009 & 2M Red cart	dem	249	Musical Fidelity A1000 Two box monster Integrated!	used	999	NAIM C0i, excellent boxed	used	599	PMC Twenty 21, excellent boxed, ex dealer demo	used	899
Thorens TD170 Auto excellent boxed	dem	249	Musical Fidelity X-T100 Integrated	dem	249	NAIM CD3.5, vgc	used	299	Proac D38 in Yew, boxed fair	used	2499
Thorens TD150, SME3009 good condition	new	299	Musical Fidelity Pre 8 and 2 x MA65 chrome fronted	used	799	NAIM CD5, recent new laser, upgradeable	used	499	Proac Studio 140 mk2, nr mint boxed REDUCED	dem	999
Thorens TD160 HD turntable	new	1199	NAIM NAC82, excellent boxed	used	899	NAIM CDX2, 2009, excellent boxed	used	1399	Proac Studio 110, excellent boxed	used	499
Thorens TD160, Audio Technica arm, boxed	used	249	NAIM NAP160, vgc+	used	449	Onkyo C7000ci, excellent boxed	dem	699	Proac Studio 115, excellent boxed	dem	749
Thorens TD160 replinthead c/w RB250, Denon cart	used	399	NAIM NAP250, very late olive excellent	used	1099	Peachtree DACit, excellent	dem	199	Proac Studio 125, great boxed - sonic bargain!	used	349
Thorens TD209 turntable package	dem	699	NAIM NAP42.5/NAP110, vgc	used	349	Prima Luna Prologue 8, ex demo boxed	dem	1299	Proac Studio 140 mk2, mahogany	used	549
Thorens TD2030 Blue turntable	new	999	NAIM NAP250, excellent late boxed olive	used	1199	Project Stream Box, excellent boxed	used	349	Quad 11L2, excellent boxed	used	249
Thorens TD1259, excellent	used	399	NAIM NAP150, excellent boxed	used	349	Quad 99CDP, excellent REDUCED	used	349	Quad 9AS Active speakers, excellent boxed	used	379
Tom Evans Groove, 0.85mv/100 ohm, excellent	used	849	NAIM NAP180, excellent boxed	used	599	Rega Apollo R, excellent	used	449	Red Rose Rosebud £2.5k new with (used) stands	dem	799
Townshend Elite RCT c/w Excalibur/Merlin/Cover	used	999	NAIM NAIT 5, excellent remote boxed	used	399	Rega Apollo 35th Anniversary, excellent	used	449	Rega RS3, vgc+, boxed	dem	449
Transfiguration Orpheus L, good condition	used	799	NAIM NAC152/NAP155XS, excellent boxed	used	1199	Rega Saturn, excellent boxed	used	599	Rega RS1, vgc+, boxed	dem	249
VDH Colibri M/C cartridge	dem	2999	NAIM NAC90/NAP92, vgc	used	349	Revax H2 CD Player with H8 remote	used	599	REL T-52 Subwoofer, vgc+	used	299
VDH Condor M/C cartridge	new	1999	NAIM NAP250, chrome bumper	used	699	Roksan Caspian Mk1, vgc	used	299	REL Storm, vgc+ bargain!	used	99
VPI Scout, JMW arm excellent	used	999	Neutonia Salis Integrated, classy Restek built	used	299	Sansui WLD201 Streamer, mint boxed	used	129	Revel Studio 2, sealed boxes, £15k, save a fortune	new	5999
Wilson Benesch Act 1 Tonearm, nr mint superb	used	799	Onix 0A32 Integrated, excellent	used	399	Sugden Masterclass CD original version	used	999	Revolver Music 1, excellent boxed	used	299
Zeta Tonearm, excellent	used	599	Onix 0A25 Integrated, excellent	used	399	TAG McLaren DAC 20, excellent	used	249	Revolver Cygnis Gold in Black, £14k new	dem	4995
Radio/Recorders			Pathos Logos Integrated	dem	1999	TEAC Distinction CD3000, excellent boxed	used	599	Sonus Faber Elipse, superb boxed	used	5999
Arcam Alpha 10DAB tuner, excellent	used	149	Pioneer Spec 3 Preamplifier, vgc	used	449	Tube Technology Fulcrum CD transport	dem	699	Sunfire True Sub Subwoofer	dem	399
Arcam T61, vgc+	used	79	Placette Audio Passive Line stage	dem	599	Tube Technology Fulcrum DAC (inc DAC64 chip)	dem	899	Tanoy Prestige Autograph Mini, ex boxed	used	999
Cyrus FM7, excellent boxed	used	99	Prima Luna Prologue 3 Preamplifier vgc+	dem	649	Yamaha CD-S3000 near mint	dem	2249	Tell CS7.2, vgc, just refurbished...	used	2499
Denon TU1800DAB, vgc remote	used	149	Prima Luna Prologue 3 Preamplifier, REDUCED	dem	749	Accessories/Cables			Totem Mani Signature, boxed near mint	used	2999
Musical Fidelity A5DAB, sealed box	used	499	Puresound L300 valve preamp	dem	3599	Audeze LCD2 excellent	dem	599	Totem Mite in black	dem	449
NAIM NAT01 and NAPST chrome, serviced, vgc+	used	899	Quad 99 Power, excellent	used	299	Audeze LCDX excellent	dem	899	Totem Rokk in mahogany, excellent	used	249
NAIM NAT101 & SNAPS, excellent £500 NAIM service	used	899	Quad 405, from	used	199	Beyer Dynamic T1, vgc boxed	used	299	Totem Sftat, near mint boxed	new	999
Nakamichi DR10, excellent	used	249	Quad 33/303, vgc, serviced	used	299	Bryston BHA-1 Headphone amplifier, superb	dem	999	Totem Mani 2, excellent boxed	used	1899
Nakamichi CD2, excellent	used	99	Quicksilver 8417 Monos with spare valves	used	799	Cyrus PSXR, excellent from	dem	279	Usher N6311, transit damaged to clear	dem	499
Nakamichi CR7e, B&W service 2013 excellent	used	1199	Renaissance RA02 Monos, vgc and excellent value	used	499	Elemental Audio Equipment Rack	dem	499	Usher Mini Dancer 1, excellent boxed	dem	1999
Nakamichi BX2, excellent	used	149	Roksan Kandy K2 Power, nr mint boxed	dem	499	Elemental Audio speaker stands	dem	499	Vandersteen Quattro, accessories, transformers etc	used	2999
Nakamichi 580, near mint boxed	used	249	Sansui AU-999 Integrated - fab!	used	999	Ergo AMT phones with Amp 2 (£2.5k new)	dem	1499	Velodyne DD18 sub in black	dem	1999
Pioneer CT91a reference	used	199	Sugden A21a line integrated	used	6249	Grado GS1000 and RA1 amplifier	used	599	Veritas H3 (Lowther drivers) in gloss black, 100db	dem	2999
Pure 701ES DAB Tuner	used	89	Sugden Masterclass Pre/Monos in Graphite	used	6499	Musical Fidelity M1 HPAB	dem	399	Wilson Audio Duette, excellent	dem	4899
Revax PR99, rated	used	799	Sugden Masterclass Pre/Monos in Titanium	dem	2749	Musical Fidelity Triplex power supply	new	199	Wilson Benesch Actor floorstanders	dem	1999
Sony TC-K611S, 3 head, vgc	used	799	Tag McLaren 60iRV, excellent boxed	used	299	NAIM Naxo 2.4	used	199	SPECIAL SYSTEM DEALS		
Tandberg TCD440a, superb!	used	499	Talk Electronics Hurricane/Tornado Pre/Power	used	Call	NAIM XPS DR, ex demo	dem	2599	Consonance Ping CD/AMP	dem	599
TEAC V8000S, superb	used	299	Tannoy TA1400, excellent boxed	used	599	NAIM Hicap, current case, excellent	used	499	Linn Klassik Movie 05, excellent boxed	used	699
TEAC X1000M, serviced, superb	used	599	TEAC Distinction A1000 Integrated, ex demo	used	599	NAIM HiCap, various Olive/Chrome	dem	399	NAIM Uniti 24/192, excellent	used	1349
TEAC X10R, serviced, superb	used	599	Trio L07C preamplifier good condition	used	249	ProAudio Bono Reference Platform	used	399	Orelle EVO CD and Amp was £2700	used	799
Technics RS1500 in flightcase near mint	used	2499	Unison Research Simply Italy Integrated	dem	999	Quadraspire racks various	used	999	Yamaha CXAS000/MXAS000 as new boxed	dem	Call
Rotel RT1080, excellent	used	149	Unison Research S2k Integrated, excellent	dem	699	Stax SR404/SRM006iit, stand, cover etc boxed	used	1999			
Yamaha KX1200 excellent	used	199	Yamaha A-S3000, nr mint boxed	dem	1999						

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STANDS THAT DELIVER

For most of the review period I used the D1s on the end of Spondor's matching stands — available for an extra £595.

Unlike many other designs, these are of a low mass construction and consequently exceedingly light. They work by using damped panels at key points to immediately absorb excess energy from the loudspeakers and then dissipate it through the frame — unlike heavier models which seek to transfer it to the ground. It's similar to the technique employed on Spondor's own loudspeakers to minimise cabinet resonances.

Standing 600mm to provide the right height for the D1s they also include a cable management system on the rear of the main support to keep connections neat and tidy while the main plate exactly matches the dimensions of the base of the D1s.

In use the Spondor stand definitely seem to bring out the best in the D1s — bringing an added sense of space and atmosphere to the treble and midband. Switching to a pair of heavier metal stands the sound seemed to close in slightly with a diminution in outright detail and delicacy.

Interestingly, they also proved effective on other standmount loudspeakers. Trying them with a pair of the excellent Opera Mezza 'speakers (see Hi-Fi World September 2015 edition) again they seemed to bring slightly more top end extension and a little more coherence to the overall presentation.

It's not night and day — and might not work for every loudspeaker. But anyone considering a pair of Spondor D1s should definitely factor in an audition — and users of other models may also want to give them a try.



CONCLUSION

Too many small loudspeakers attempt to do things they are just not physically suited for (high sound pressure levels, deep bass etc.) — luckily the Spondor D1 isn't one of them.

Instead it concentrates on what it can do and tries to do it to the best of its ability. Consequently, you get an expansive, spacious sound with plenty of detail and smooth top end

and treble allied to great dynamics.

It probably won't be the first choice of dance music or heavy dub aficionados due to its lack of outright bass extension (there are other 'speakers in the Spondor line-up for that will give you that if required).

But if you are after a compact loudspeaker that is able to sound

eminently musical while not taking up too much space, then the Spondor has to be high up on your list.

Partnered with a decently powerful amplifier (I'd recommend 60 Watts as a minimum to get the best out of them) the Spondor D1s are capable of making a very good sound indeed.



The sealed-box design features a single pair of loud-speaker binding posts on the rear of the cabinet.

MEASURED PERFORMANCE

Frequency response of the Spondor D1 measured very flat across the midband and treble regions, absence of a dip around 3kHz showing good drive unit integration that will ensure the speaker doesn't sound 'mild' or soft in detailing. The tweeter measured very flat

both on and off axis, meaning the D1 will not change its subjective balance when pointed at listeners, or straight down a room.

There is a lift at low frequencies, below 400Hz, that at +3dB is sufficient to add body to the sound and may well add to its weight. Below 100Hz however, bass rolls away and this means the D1 has been designed to work close to or against a rear wall.

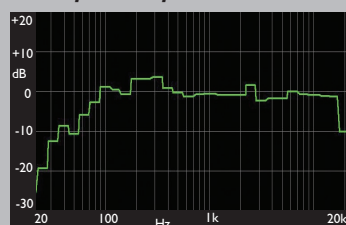
The D1 uses a 6.5 Ohm d.c.r. bass unit, a high value, making overall impedance high; it measured out at 10 Ohms overall, where most loudspeakers use 4 Ohm bass units and come in at 6 Ohms when additive reactive elements are taken into account. As a result the D1 was insensitive, producing just 83dB Sound Pressure Level (SPL) from one nominal Watt (2.8V) of input, so it needs a powerful amplifier with good voltage swing to go loud and 60-100 Watts will likely be needed, according to room size and the volume level used.

The D1 measured well; it is distinctive in places and needs power, due to insensitivity. **NK**

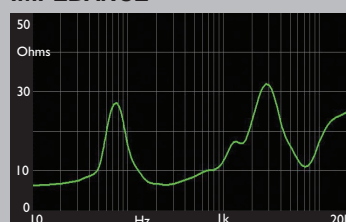
FREQUENCY RESPONSE

Green - driver output

Red - port output



IMPEDANCE



SPENDOR D1 £1795



OUTSTANDING - amongst the best.

VERDICT

A fine mini-monitor that combines a spacious soundstage with a smooth and detailed presentation. Great build quality adds to the value.

FOR

- smooth treble
- spacious sound
- fine imaging
- build

AGAINST

- lacks deep bass

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Dooleys HiFi Macclesfield, Cheshire:	01625 264666
Evolution Audio Selby, N. Yorks:	01757 706372
Mackenzie Hi-Fi Wellingborough Northants:	07905 362545
Midland Hi-Fi Studio Finchfield, Wolves:	01902 380083
Music Matters Hatch End, Middx:	02084 201925
Zouch Audio Ashby-de-la-Zouch, Leics:	01530 414128

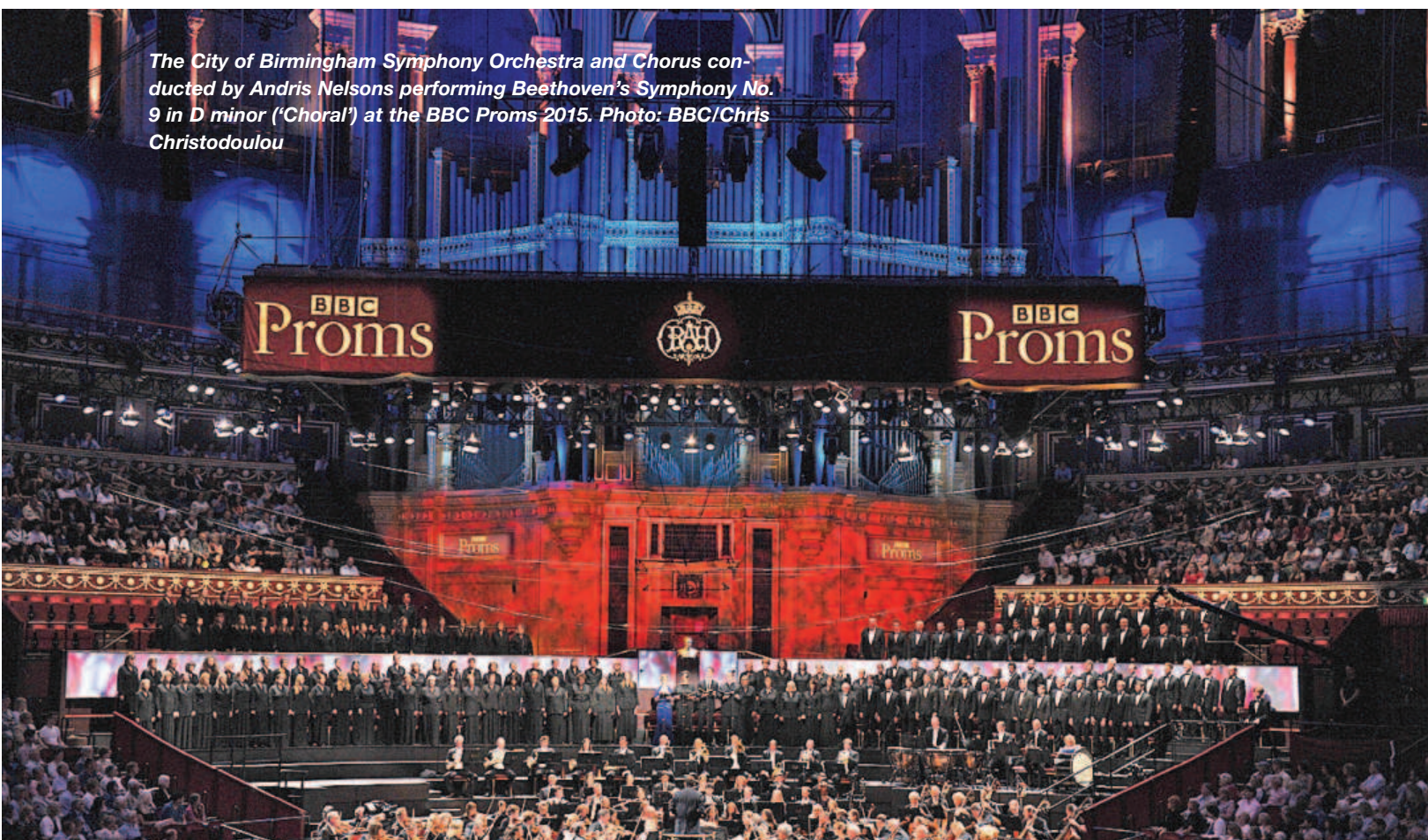


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From the Albert Hall to your home

The City of Birmingham Symphony Orchestra and Chorus conducted by Andris Nelsons performing Beethoven's Symphony No. 9 in D minor ('Choral') at the BBC Proms 2015. Photo: BBC/Chris Christodoulou



Martin Pipe goes behind the scenes at the Royal Albert Hall for a fascinating look at the technological expertise that goes into broadcasting the annual BBC Proms concerts on both TV and radio.

There's little to compare to being in the presence of a world-class symphony orchestra in full flow. The seemingly-possessed conductor tearing through the manuscript's pages. The bows of the first violins, thrusting in dramatic unison. The massed ranks of the brass, firing random reflections of the venue's lighting towards an enraptured audience. And of course there's the music – an exciting and addictive brew of tonal colour, complex interplay and enthralling rhythm. Attending

a classical concert is alas seldom a cheap experience owing to its sheer scale. One exception is the BBC Proms, a joyous two-month summer festival of world-class performances focused on the Royal Albert Hall.

If you're fortunate enough to get to South Kensington and are prepared to stand, a £5 Prommer's ticket could informally plonk you in front of the orchestra (the Arena) or give you the chance to enjoy a performance from a higher perspective (the Gallery). This year, the RAH is hosting 76

Proms concerts. You'll usually hear a piece by an established composer, accompanied by a new work – often specially commissioned by the BBC. Non-classical genres covered by this year's Proms have so far included Bollywood, Frank Sinatra, the Ibiza dance scene, urban/hip-hop and ambient.

Then there are the Proms Plus talks – free events hosted at the Royal College of Music (RCM), Proms in the Park and, of course, the British institution that is the Last Night of the Proms. But if travelling to London



Andy Payne rehearses the mixing of TV sound on his StageteC Cantus console.

isn't practical, every nuance of every performance is available in your home courtesy of Radio 3. Some Proms are also carried on BBC TV. We take radio and TV for granted, but while listening to a Prom I have always wondered about the magic that brings that glorious sound into our living rooms. And this year, I ventured to the RAH to find out.

No valuable BBC equipment is left in the Royal Albert Hall (RAH) outside of the Prom season, so it must be installed before the series begins and removed afterwards. A team of up to 15 technicians is involved in the process of readying the venue for broadcasting. Their work includes running cables, installing microphones, erecting scaffolding, setting up lighting and configuring equipment. A large number of microphones of various types are installed during the four-day period before first night. These mikes – the start of a Prom's sonic journey – are shared between TV and radio.

According to 27-year Radio 3

veteran and Operations Manager Huw Robinson, the Proms broadcasts "use a selection of mikes with different polar patterns, depending on where in the orchestra they are placed. We use a mix of omnidirectional, cardioid (directional), figure-of-8 (front and back) and sub-cardioid (a halfway house between cardioid and omni) types from manufacturers like DPA, Schoeps, AKG and Neumann". Many are suspended above the orchestra, using steel wires slung between balconies. They're designed and installed in such a way that they're not usually noticeable on TV, and their positions are fixed for the duration of the Proms. Others, such as specific instrument mikes on unobtrusive stands, are brought in as and when

any MADI equipment that might be in use, to the StageteC mixing consoles of the radio and TV outside-broadcast (OB) trucks via optical fibres. Routing of signals into and out of the truck can be controlled via Windows software. Thanks to this arrangement, TV and radio OB sound trucks each get duplicated sets of fibre-optic cables containing raw signals from all available mikes. They go into the console, where the engineer mixes and balances the audio uniquely for his/her medium. The mixing desks, being digital throughout, can draw on a considerable degree of automation. The best settings for each Prom – gain, equalisation, effects, panning, channel-grouping and so on – can be determined during the rehearsal,



Within the confines of the OB truck, the engineer mixes all of the incoming signals on a StageteC Nexus digital console for Radio 3.

they're needed.

To achieve the fullness, stereo spread and convincing sound balance for which the BBC's Proms coverage is renowned, a total of "around 140" is used, Robinson told me. They include "54 slung mikes and 58 stage mike inputs". On top of this are feeds from any PA system that performers might be using on stage. These are fed into the system via hardware conforming to MADI (Multichannel Audio Digital Interface, a professional standard also known as AES10). Mikes are connected via standard balanced cables to StageteC Nexus 'stage-boxes'. The latter are racks containing up to eight cards – one per microphone or alternative input source (e.g., guitar pickup or electronic keyboard) – that combine the duties of preamplification/equalisation, conversion to digital – here, 32-bit at 48kHz – and time-alignment.

Their outputs are routed, together with the signals from

and then stored for recall during the actual performance.

Former BBC TV OB sound supervisor Andy Payne, who now offers his services to BBC TV sound through his Sound Alliance company, told me that the BBC has "been producing 5.1 for (HD)TV broadcasts for over 10 years now - Last Night of the Proms was amongst the very first live 5.1 surround broadcasts made by the BBC". Payne told me that he "mixes for 5.1 and subsequently reduces that to two-channel". Indeed, Bowers and Wilkins 5.1 monitoring speakers were (impressively!) crammed into the TV sound truck.

"When we first started producing 5.1 for TV" Payne explained, "we found that the traditional slung-mikes coverage did not work well in creating a good 5.1 sound that successfully down-mixes". The BBC developed its own techniques, based on a 'Decca-tree' approach for stage coverage and



Watched over by the bronze bust of Proms founder Sir Henry Wood, the Aurora Orchestra and the BBC Proms Youth Ensemble perform the world premiere of Anna Meredith's 'Smatter Hauler'. Photo: BBC/Chris Christodoulou

an overhead array of four figure-of-8 ribbon microphones, known as a Hamasaki square, to capture surround ambience. This configuration was developed by a sound engineer at the Japanese public broadcaster NHK.

The Hamasaki square is also available to Radio 3, where it can be used as part of its experimental 4.0 (quadraphonic!) surround stream. In total there are 15 TV specific slung mikes catering for 5.1. On-stage 'spot' and 'accent' mikes for performers are agreed during rehearsal, and shared with radio. With radio, though, balancers don't start with surround and work their way down. Everything is instead mixed in the OB truck for two-channel from the start; this, after all, is how most Radio 3 listeners will hear it.

Radio 3's 4.0 online stream can, in theory at least, be totally unique as stereo compatibility isn't needed. In practice, though, it usually consists



The BBC National Orchestra of Wales conducted by Thomas Søndergård, the Ten Pieces Children's Choir and Chase Bridge Primary School pupils perform at the first ever Ten Pieces Prom. The slung mikes are clearly visible. Photo: BBC/Guy Levy

feed, which will be available for the duration of the Proms, is particularly interesting. You need a PC to receive it; multichannel audio can be sent via HDMI, or in analogue form from its soundcard, to an AV receiver. It's 'raw', meaning that there are no radio announcements or talks. Its intention is to provide a listening experience closer to being in the RAH during a performance. If you want to listen the URL is www.bbc.co.uk/taster/projects/proms-surround-sound

It's the work of Robinson, who divulges some technical details: "Sampling rate is 48kHz and the resolution 16-bit. Channels are coded as two channel pairs – front and rear – and a single-channel element (centre, fed with digital silence) which we include to ensure the correct layout at the receiving end. The AAC-LC encoder is configured for 320kbps output, and allocates bitrate across the channel elements as required. The MPEG-DASH



Just some of the large array of equipment in the radio truck used for mixing live broadcasts of the BBC Proms.



The Last Night of the Proms – a annual British institution. Photo: BBC/Chris Christodoulou.

of the two-channel radio mix for the front channel – minus some of the ambience, like audience hustle and indirect/reverberant sound. Its rear channels are derived from dedicated arrays of mikes like the aforementioned Hamasaki square.

When asked about the challenges of simultaneously-mixing the surround stream and stereo broadcast radio 'live', Robinson told me he applies the same tried-and-tested methodology that ensures mono and stereo radio listeners are equally happy: "although the stereo mix is the priority, the balancer will be checking the surround compat-

ibility throughout".

"As a balance aid", explained Robinson, "the direct output of each desk channel is recorded in 24-bit. We can replay and rehearse the concert if we have time; a concert rehearsal and transmission occupy about 128GB. These recordings are not kept." Things are a little different in the TV world, explains Payne. "We archive all recordings - typically around 80 channels, but more than 128 on occasions. Typically a number of Proms in the season have an "afterlife", as co-production on-sales, DVD or possibly cinematic release."

The streamed 4.0 surround

‘wrapper’, used to send the stream via the web, is ISOBMFF, also known as fragmented MP4”.

The surround stream, generated with BBC R&D hardware, is directly-injected to the internet from an access point at the RAH.

Most HFW readers will, however, be listening via Radio 3 through any of a number of platforms (the 320kbps ‘HD’ AAC stream currently represents, in my view, the best way of ‘tuning in’). The journey it takes is a long and winding one and it’s amazing that Proms concerts sound as good as they do.

The mixed and balanced two-channel output of the radio truck go, in 16-bit/48kHz form to the presentation suite in the Radio 3 Loggia box. In here, it’s mixed with audio



Francesco Piemontesi performs Mozart's Piano Concerto No.26 in D major, K537 ('Coronation') with the Aurora Orchestra conducted by Nicholas Collon at the BBC Proms. Photo: BBC/Chris Christodoulou.

from the presenter/interviewer, the ‘Proms Extra’ feed from the RCM and any previously-recorded material. Some of this is edited in a temporary basement production-suite on the SADIE system, a professional PC-based audio workstation with a user interface that will be familiar to anyone who’s tried Audacity.

The presentation suite’s mixer also provides a degree of redundancy. “If there is a problem with the truck, we can fade up a small number of mikes from there so that the broadcast can continue,” explains Robinson, “although the sound won’t be as good” Thankfully, this doesn’t happen often.

The Proms Extra events are, out of interest, served by a Roland digital mixer located in a back room of the labyrinthine RCM. It is connected to the Radio 3 presentation suite via a



A striking view of the Royal Albert Hall's fibreglass acoustic-diffusers – installed in 1969 to deal with distracting echoes. Photo: BBC/Mark Allan

cable that runs along an underground tunnel between the RCM and RAH.

Pre-recorded material can be played out there too, and there are sufficient microphones and input channels for small ensemble performances as well as interviews and talks.

The final audio from the Radio 3 presentation suite is then sent, via Broadcasting House’s central audio-routing system, to the Radio 3 continuity studios in 16bit/48kHz form across a 2Mbps EI circuit. In the Radio 3 transmission studio at Broadcasting House, the Proms are inserted into the station’s output, along with live announcements, trails and other programmes.

The output of the continuity desk passes to a signal router in the bowels of Broadcasting House, and thence to the ‘outside-world’ network that distributes BBC radio programmes to listeners. This complex mix of Internet-protocol (IP) technology, microwave/satellite

links and ‘landlines’ (high-performance telephone circuits) has evolved over many decades. In addition to the DAB and FM radio networks that many still rely on for enjoyment of the BBC’s radio output, the distribution network serves cable, terrestrial and satellite television platforms as well as the newer online streaming services.

Then there are the international links through which other members of the EBU (European Broadcasting Union) may choose to take Proms concerts. To all of these, signal distribution is in uncompressed PCM digital form – 16-bit resolution, with a sampling rate of 48kHz.

So the BBC transmits the Proms using a wide variety of transmission formats and a massive array of audio recording equipment to bring the music to UK homes and to those overseas too. The effort, however, has become internationally renown and sound quality remains an important factor in the mix.



Nicholas Collon conducts the Aurora Orchestra in a performance – from memory! – of Beethoven's Symphony No. 6 in F major, 'Pastoral', at the BBC Proms on Sunday 2 August. Photo: BBC/Chris Christodoulou.

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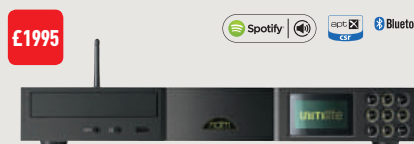


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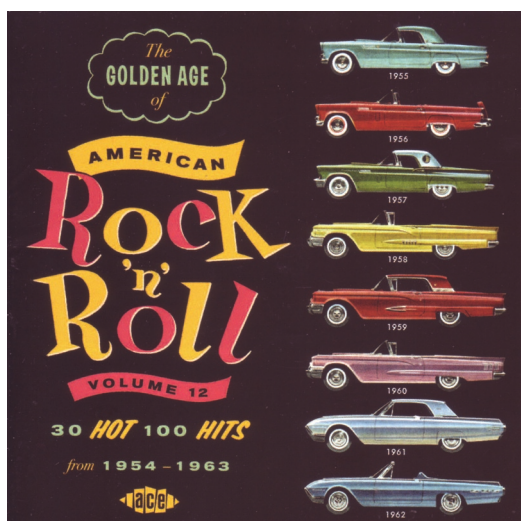
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In play, the songs are admirably dynamic. Bo Diddley's 'Road Runner' is surprisingly good in terms of sound quality. The track has the ability to offer a multi-layered playback with a 3D soundstage hovering around the stereo image. This track would have been compressed for radio play but it has a surprisingly audiophile presentation.

Not all of the tracks here retain the same quality – although it's possibly a tad unfair to be picky

when rarities are being scrutinised. Nevertheless, the next track along, The Storey Sisters and 'Bad Motorcycle', suffers from bright upper midrange frequencies while the harmonic vocals are compressed into an upper frequency lump.

Jimmy James can suffer in a similar fashion with his track 'Handy Man', especially during the crescendos and the whistling sections of the song. At high volumes you may be clutching your ears.

In audiophile terms, though, there are many good tracks to enjoy here. James Ray's 'If You Gotta To Make A Fool Of Somebody' is surprisingly good quality for a track that was released in the pop charts in 1961. The vocal is wonderfully restrained for the time and the brass around the vocal is not at all aggressive in sonic terms. Similarly, The Dovells' 'Bristol Stomp' keeps the unruly frequencies in control. It's not perfect, of course, but it gives your hi-fi a fighting chance.

AUDIOPHILE CD



THE FANTASTIC FOUR

The Lost Motown Album
Kent

From Detroit in the USA this R&B and soul group were spawned in 1965.

Their first single on Ric-Tic, 'The Whole World Is a Stage', was a Top 10 hit on the R&B charts in 1967. Then Motown bought the label and the group became Motown artists overnight and were moderately successful but never established a large discography.

This CD features the album 'How Sweet He Is' – scheduled for a 1971 release but cancelled at the last minute. The reason may have had something to do with politics and possibly because Motown were trying to separate the group's lead singer James Epps from the rest of the group for a proposed solo career. From Motown's perspective they thought, "Why invest money in a dead group?" – which is a shame because the album is a cracker. Easy on the ears, smooth, melodic and very listenable.

This 'lost album' offers

surprisingly good quality in sonic terms too. Addressing possible limiting/compression issues, there is nothing here that will worry an audiophile.

While I have heard plenty of other albums with a greater dynamic scope, for a LP of its time and from the pop-centric Motown label this release is, in relative terms, pretty darned impressive. Is that because Motown didn't spend time 'messaging' with the sound?

Also, there is an admirable clarity that allows you to easily spot secondary percussion, plus subtle brass additions that sit on the edges of the wide soundstage.

The midrange is slightly veiled and strings do not have a tremendous amount of room to roam. That said, though, vocally the harmonies are admirably smooth and textured. There is enough transparency here to allow the group to give a performance of power but also emotion.

Contemporary to the likes of Dion, this smooth sounding, richly-toned pop/rock singer had an early No 1 pop hit with The Three Chuckles called 'And the Angels Sing' which lead Alan Freed to put them in his first film, 'Rock, Rock, Rock'.

Randazzo promptly went solo and appeared in the classic cult film 'The Girl Can't Help It.' He had a number of small-time hits but made his fortune as a songwriter penning ditties for names such as Frank Sinatra and Dionne Warwick.

This 2CD collection features the solo works 'I'm Confession' (1958), 'Journey To Love' (1961) and 'Teddy Randazzo Twists' (1962) plus bonus single cuts.

In audiophile terms, Randazzo offers an interesting pattern from the beginning of the title track of 'I'm Confessin' (That I Love You). The vocal is closely miked and, because of the nature of the

recording practices for a pop artist of his day, there is some blooming in the upper mids.

It sounds almost as if he is too close to the microphone during the quieter, more intimate moments of the song. In fact, he might very well be.

When, Randazzo puts a bit of oomph into the crescendo parts, you can hear him move back from the microphone, which improves the sound quality no end.

Moving to the 1961 LP 'Journey To Love' and, well, what a difference! There is far more air and space.

The backing orchestra is light, full of energy and dynamics and, while Randazzo does like to sidle up to the microphone a tad, the bloom effect is nowhere near as bad as the 1958 LP.

Here we get to hear much more of Randazzo's voice and its capabilities. There a slight stridency but nothing to be overly concerned with.



TEDDY RANDAZZO

The Way Of The Clown
Jasmine

AUDIOPHILE CD

This luxury five CD set arrives in a pizza-style box and contains 154 tracks and a 120-page book with newly-written essays, track-by-track album notes, a discography, label scans and many rare photographs and illustrations.

Highlights include early country hits including the chart-topping 'Mule Train' (1949) and Ford's pioneering 'hillbilly boogie' smash 'The Shotgun Boogie' (1950). There is his first major crossover hit, the 1950 duet (with Kay Starr) 'I'll Never Be Free', plus two never-before-released songs ('Slow Down' and 'Small World'), numerous singles and album tracks not previously reissued on CD, and several rarities. These include Ford's 1955 recitations of Davy Crockett tales, as well as some 1958 public service jingles to promote the U.S. Marine Corps 'Toys for Tots' charity program.

In sonic terms the first track 'I've Got the Milk 'Em In The Morning

Blues' displays how high the volume is on the early tracks, which shows compression during the mastering that's more to do with the original sources. The compression on these early tracks reminds me of the Beatles stereo releases, etching detail with upper-mid lift. There's certainly no 'loudness' issues here that destroy detail. As such, Bear Family has done well to keep this element under control.

Later in the set, this compression becomes less of an issue on tracks such as the low tempo 'Browns Ferry Blues' which shows enhanced clarity and a wide soundstage with plenty of detail on the soundstage extremes.

Even on high tempo releases such as 'Blackeyed Susie' the more mature masters show a wider dynamic front with delicate reverb, air and space that enhance the staging. Again, Bear Family has been sympathetic and careful in their remastering process.



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Portrait Of An American Singer
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Cyrus original PSX great condition	Linn LP12 with Ittok with lingo PSU superb condition	Pioneer PD9700 stable platter	Mission 752 black finish	Sony ST8900 QS DAB tuner	Tannoy III LZ with monitor gold
Cyrus 2	Linn LP12 affromosia finish (lingo PSU missing)	Primare 30.2 cd player boxed	Mission 752 black finish	Technics STG90L top of the range tuner	Tannoy Chatsworth with monitor gold
EAR 834L	Michell Hydraulic Reference turntable	Rotel RA965 BX classic old school cd player boxed mint condition	Mono Pulse 32S ex dem.		
EAR V20 valve amplifier	Michell Gyrodec SE with Techno arm boxed mint	Rotel RA965 BX classic old school cd player boxed mint condition	Monitor Audio 2 bookshelf speaker with rosenut finish		
EAR 802 classic valve with pre amp phono stage (just serviced)	Michell Gyro SE special order black finish brand new in a box, sealed box	Sony CDP X-B920E	Monitor Audio reference 700		
Harmon Kardon 930 twin powered receiver	Ortofon SPU-GT cartridge independently checked as new condition	Sony XE680 SACD player	Roxsan K2 rosewood finish		
Harmon Kardon HK770 power amp	Optonica RM7100 direct drive top of the range turntable		Sentorian early 60s corner speaker pair		
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"I can't quite believe a £35 computer delivered in a tiny cardboard box can do all this"



Noel Keywood

A long time ago – 1983 if my memory serves me correctly – I bought a computer to see what all the fuss was about. My experiences of running a command-line driven ACT Sirius with left hand, whilst reading CP/M-86 code from a book in right hand, isn't one I am keen to repeat. Computers at this level are something children are welcome to if it keeps them quiet.

Which is why any mention of the Raspberry Pi mini-computer has left me cold so far. Do I want to go (back) there? Definitely not. Even the name smacks of geek-dom wrapped up in the flimsiest costume of deceit. If there is merit in coding that's fine but others are welcome to it. And Linux.

So when a Raspberry Pi 2 Model B arrived in our office, for review, I looked askance at it. In truth, it wasn't the Pi we had agreed to review but an add-on Element 14 Cirrus Logic audio processing board (Version A1.01) with analogue and digital inputs and outputs. Using Cirrus logic audio chips, this looked quite tasty. But to get this little shebang up and running on the test bench to measure it, we first had to get the Pi working. A suitable victim for this process was at hand.

I was more than a little surprised when my son, mistakenly interested in computers I believe (!), had the thing up and running in five minutes. More surprising, there wasn't a command line prompt in sight – you know, one of those little green flashing triangles you see on the computer screen in spy movies, where the hero enters arcane code to stop the bomb going off. Instead, up came a simple web browser and something even I could recognise as the internet.

Since all this was pouring out of

a tiny little circuit board that costs £35, I was taken aback.

And I could see no trace of Peppa the Pig either. Perusing the Raspberry Pi site in advance had warned me this gadget is aimed at schoolchildren but what I was seeing suggested it had more serious everyday uses too – and that is indeed the case. Raspberry Pi cannot only be used for everyday computing, it also raises some very interesting issues over the future of computing, ones I can't help but feel Apple and Microsoft will be concerned by.

As it stands, Raspberry Pi can run Libre Office on its Raspbian operating system. Libre Office is much like Microsoft Office but it is free. This caught my attention straight away because I am a fan of Open Office, using it almost daily – and Libre Office is a derivative. It has a word processor, spread sheet, drawing, maths, charts, database and presentation programmes. You can do a mountain of work with this one package alone and don't sneer; Open Office shades Microsoft Office. Then there's Mathematica 10 from Wolfram that is going to be included in the OS in future – this one is for boffins – and the Pi can be used as a home media server too.

All of which leaves me almost speechless! I can't quite believe a £35 computer delivered in a tiny cardboard box can do all this. It's a fraction of the size and price of my Mac Mini that itself is a fraction of the size of my PC and Pi even challenges the £280 Chinese Lenovo computer running Windows 8 I bought my son the other day – seemingly a bargain at the time.

By casting aside casework, memory and disc drive, Raspberry Pi cuts the ground from underneath these products in terms of both size and cost. It can be put into a tiny custom case of plastic – there are

lots of them – and the low power consumption ARM processor means it runs cool, so no cooling fans or noise.

A massive power supply is not needed, as in PCs of yore, just a tiny 5V USB phone charger supply able to provide a measly 1 Amp.

And forget disc drives – so yesterday! You store everything on a microSD card or a USB connected external drive if you are addicted to cogs and wheels.

With this stunning simplicity, over 4 million have been sold to date and Raspberry Pi has become something of a global success. Its ARM based processor derives from the BBC Acorn micro, another 1980s wonder, and UK component supplier Farnell produce and sell the Raspberry Pi board as well as the audio board we received for review.

It's all too good to be true – and that's because it isn't! Well, not entirely. Attempts to measure the Raspberry Pi audio board were met with the need for long code lines to be typed in – oh dear! Back to the 1980s.

To be frank, we were hoping to get a review into this issue but whilst we have at this time managed to play music back, and even record it from the analogue input, recording from S/PDIF in and transmitting via S/PDIF out defeats us. To do this we must discover the relevant code on the forums, we have been told by Wolfson, the UK arm of Cirrus Logic. At present our search has revealed nothing. Hopefully we'll have this little difficulty solved by the next issue.

So Raspberry Pi isn't a Mac challenger yet, unless you revel in command line computing and can write missing code yourself. Yet it has great potential. I do hope we can bring you more about the Pi's latest audio card next month, not 2083. ●

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"An electric guitar is the perfect tool for expression, for howling at the moon"



Paul Rigby

I don't want to push aside hundreds of years of music history into a very large corner – but the electric guitar might just be the most important and popular musical instrument there has ever been.

The reason I venture to say this is because it brought professional and studio quality music technology to ordinary people way before the internet and computers hit the scene. Even in these days of computers, it still dominates. It's still seen as an essential component in popular music.

There's also none of this 'studying at college for several years' rubbish with a Fender. An electric guitar is relatively cheap so poor people have a good chance of grabbing one and, if you get your head down, you can not only learn to play one in your bedroom, on your own, but the instrument opens itself up to innovation and exploration. Again, without a teacher saying, "No, sunshine, stop doing it that way. You can't, it's against the rules". With an electric guitar, there are no rules.

An electric guitar is also LOUD (well, as long as you connect it to a big enough amp). It is the perfect tool for expression, for howling at the moon and your audience.

It is also the perfect tool to rebel. As such, it can be a weapon against perceived injustice, against restriction and, well, just 'against', anything basically.

An electric guitar is also full of emotion. It can produce anger and happiness, it can make you laugh and cry like a baby. In the right hands, an electric guitar can talk like no other instrument can.

Related to that, an electric guitar is a great communicator. It crosses country and cultural boundaries and needs no interpreter. In a world of

seemingly eternal conflict, we need more tools of communication like the electric guitar.

Now, as in all walks of life, some people are good at some skills, some are particularly talented and some are total and utter geniuses. As such, there guitarists and then...there are guitarists.

We know a lot about those sort of people: Jimi Hendrix, Eric Clapton, Jeff Beck, Jimmy Page, Ritchie Blackmore. And that's just the rock fraternity. There are others, of course. In some respects, there are also more important guitarists out there than the collection of luminaries that I've just listed.

Important because the early pioneers where just that. They showed the rest just what was possible. Even if the players who were influenced by the pioneers didn't copy them directly, they opened doors to the possible and allowed them to develop their own unique styles.

I'm talking about fuzz guitar man Link Wray, surf guitar genius Dick Dale and Johnny 'Guitar' Watson who was so good at his craft that, yes, he even had the name of his instrument as a middle name. All can be found on CDs published by the Righteous record label.

The label's compilation 'The Kings of Distortion Meets The Red Line Rebels, 27 Tracks of Fuzz, Feedback and Fury' is the rather long yet wholly emotive title that says it all.

On this CD is Wray, the man who apparently stuck a screwdriver (or was it a pencil?) in his speaker and produced the first distortion from his guitar amp.

On this CD too is Roy Buchanan, one of the finest guitarists of the blues rock genre. Terribly ignored but a man who directly influenced Jeff Beck, The

Band's Robbie Robertson and ZZ Top's hirsute fretboard wizard Billy Gibbons.

Guitar Slim was one of guitar history's greatest showmen: he needed every inch of his 350 feet of guitar line back to his amp. In technical terms, though, he was a direct influence on the likes of Buddy Guy, Earl King, Guitar Shorty, Albert Collins and Chick Willis. Quite an array of blues greats right there.

Johnny Guitar Watson is there too, but also on his own CD with soul vocalist, Larry Williams on 'Two for the Price of One'. Watson was known for his blistering rapid-fire attack, done without the aid of a pick, that was wowing audiences well before futuristic effects that rock guitarists flaunted – what – fifteen years later?

Then there was a king of surf guitar who appears on 'The Search for Surf'. Dick Dale was the king of the surf guitar and basically invented the entire genre.

Full of fire, Dale was also technically gifted. His innovations included merging cultural styles from Eastern Europe and the Middle East and his mobile reverb units were truly inspirational. Well, Jimi Hendrix thought so, he played the guitar exactly like Dale: upside down and backwards without restringing it for his left-hand play.

There's plenty of other guitar acolytes of this compilation including The Scarlets, The Routers and The Tornadoes.

So, yes, the guitar is all things to all men and women but it helps to be enlightened by a guitar god who doesn't impose his or her technique upon you.

Instead these masters of their trade just say, "Here, look what I can do, you can do it too and here is the pathway to your own inner glory". ●

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"It is again an offence to copy digital music files from one device to another – even for personal use"



Jon Myles

I've been breaking the law again – and, I'm sorry to say, so have a fair few of you in all probability.

It's rather galling because for a good few months I'd been determinedly on the straight and narrow. But then, thanks to the vagaries of the law, I transgressed again.

My crime? Copying some of my CD collection onto an iPhone. Oh, and to compound my guilt, I've also transferred some of my legitimately purchased high-resolution music files to a suitably equipped Plenu portable music player. And as a final clincher I also have more than 20,000 tracks on a NAS drive all of which were sourced from my own CDs or paid-for downloads.

All of which means I'm breaching copyright and, strictly, open to a civil or criminal prosecution. Confused? I don't blame you. But let me explain.

Last October the government introduced a law to overcome the ludicrous anomaly that it was illegal to copy digital music files from one device to another for purely personal use. It made perfect sense. After all, if you've paid £10 or more for a CD where is the harm in copying it to a music player for listening to while you commute to work or drive around in your car?

The obvious caveat in the new Copyright and Rights in Performances (Personal Copies for Private Use) Regulations 2014 – to give it its full name – was that it would still be an offence to share the copies with anyone else or sell them on for profit.

All of which seemed eminently sensible and a legitimate effort to update some obviously out-of-date legislation so it kept up with the

modern age. Except that was not the view of the British Academy of Songwriters, Composers and Authors (BASCA) nor UK Music which, according to its own website, pushes "the key business and political agenda of the music business within Westminster, with senior corporate leaders and the media".

So instead they took legal action to overturn the new legislation – which the High Court duly did in July 2015 meaning it is again an offence to copy digital music files (as well as DVDs and e-books) from one device to another even if it is purely for your own use.

BASCA and UK Music claimed that the new law would result in a loss of revenues amounting to some £58 million a year to commercial rights holders and argued the government needed to initiate some form of compensation scheme to offset the losses before any change in the regulations.

This I could never agree with. Copying of CDs to portable devices or NAS drives results in absolutely no loss whatsoever to the music industry – it's the consumer exercising their right to listen to legally bought content in whatever form suits them best.

It also has echoes of the ill-fated 'Home Taping Is Killing Music' campaign during the 1980s which at one point saw record companies proposing a levy on the cost of cassettes to compensate them for loss of revenues. Naturally, this proposal garnered almost zero popular support – mainly because it was totally unworkable. Crucially, why should someone buying a cassette to tape their child's first words or make an outdoor recording have to pay extra?

But the latest impasse does show just how difficult lawmakers are finding it to shape legislation in the face of rapidly advancing technology. For example, we already have the bizarre anomaly whereby printed books are exempt from VAT on the principle that it would be rightly seen as a tax on knowledge, while e-books are not.

Of course, in the end it all boils down to money. The government is unlikely to abolish the VAT charge on e-books as the Treasury rather likes the revenue it brings despite the fact it is clearly unfair.

And BASCA and UK Music know there's no way they can stop people copying CDs or DVDs onto various different devices but have sensed an opportunity to wring some cash out of the government before giving their backing to reforming a patently archaic piece of copyright legislation.

So what happens next? All parties have said they will engage in a series of talks over the next few months to try to resolve the matter. Which probably means some form of working party will be formed to engage in a series of circular discussions costing the taxpayer large sums, before a consultation paper is issued and, most likely, the whole thing ends up back in the courts at some stage.

In the meantime the humble consumer is left in limbo. Personally, I'll continue copying music from one device to another for my own personal enjoyment – as I'm sure millions of other people will on a daily basis, because that flexibility is part of what I paid for in the first place in my view. I wish to enjoy what I pay for. To frustrate this perfectly reasonable desire is to devalue the worth of recorded music. ●



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"The H2n is easy to use, effective, a lot of fun and well worth the money"



Martin Pipe

During my research into my continuing Olde Worlde series on quadraphonics, I have come across many interesting stories and artefacts ranging from equipment to the records to play on it. One of the latter came my way courtesy of our esteemed Editor. It's a 1973 Warner LP called 'Sound in Motion' and one of the earliest products of a firm that was later to attract a lot of attention from vinyl-loving audiophiles – Mobile Fidelity Productions Inc. The album was designed to fully-exploit the four discrete channels of the JVC-invented CD-4 (Compatible Discrete 4-channel) quad vinyl format that is described in this month's Olde Worlde.

A look through the relevant lists shows that the record was however also released in Q4 format – 7.5ips four-track, four-channel reel to reel. Q4 was the best (and most expensive) way of enjoying four-channel music. But discrete 4-channel was an important requisite. Sound in Motion contains a number of 'field' recordings made in the early 1970s; its subjects include the 1970 National Championship Air Races held in Nevada, various old locomotives, San Francisco cable-cars, a London rag-and-bone man, stock-car racing and the bustle of Portobello Street market.

The fascinating result makes excellent use of quad's wrap-around potential and is a definite aural 'time capsule'. 'Sound in Motion' wasn't, though, the first CD-4 field recording of steam locos at work. That honour went to 'Live Recording of Steam Locomotives D51', an even more obscure album issued by JVC itself. Photos on the album jacket illustrated the modest hardware that JVC's engineers used to capture the Japanese D5-class locomotives.

The four-channel tape machine, for example, looks like a domestic machine of the sort that was sold for the enjoyment of Q4 reels. Its capacity was clearly restricted to the seven-inch reels of home decks, and this was evidently a quarter-inch machine. The machine may, however, have been modified to work at a tape speed faster than the 7.5ips familiar to home users.

And the four-channel microphone system, shown mounted on a trackside tripod, is something of a 'lashup'. It's amazing that the record sounds as good as it does. Compare JVC's low-budget efforts to those taken by Mobile Fidelity. As the Sound in Motion album jacket notes tell us: "Mr. Carl Countryman was commissioned to design and build a complete, portable, self-contained 4-channel field system. Step one was the 4-channel, 1/2 inch tape deck, power self-contained, weight 46lb., with frequency response from 20 to 20,000 plus cps".

Then there was "step two", the microphone array that fed the recorder. Nicknamed 'Q4', this piece of custom transducing "combined 4 precision microphone elements, whose outputs are combined to generate information from 360-degree sound sources". Judging by my experiences, and a selection of contemporary quad gear, the results were worth all that effort.

So why am I mentioning this? Today, you can buy a neat little gadget called the Zoom H2n. This is a truly self-contained four-channel recorder, with the microphone capsules built into its top section. It fulfils the same basic function as all that wonderful Countryman machinery but it weighs rather less than 46 pounds. Indeed, the user-friendly menu-driven 130-gram device will fit into a pocket.

Instead of half-inch tape, it uses cheap SD cards – up to 32GB

– with PCM digital recording modes of up to 24-bit/96kHz. In fact the H2n literally goes one better than the Countryman Q4, insofar that a fifth mike capsule is incorporated. This allows the H2n to operate in a two-channel mode called mid-side (M-S) stereo. M-S is useful for some applications as compatibility with mono playback systems is improved, and it's possible to modify the width of the stereo soundstage after recording.

Conventional two-capsule (X/Y) operation, which uses the opposite-facing pair of mikes, can also be selected with a top-mounted dial. Other modes are '2-channel surround' mode, which harnesses all mikes, and 'pure' 4-channel. This uses the X/Y and M-S side mikes simultaneously to capture the complete front/rear soundfield.

The H2n works exceptionally well considering how inexpensive it is (less than £150 on-line). Separation in four and two-channel modes is excellent. In X-Y stereo mode (which will also give you a choice of MP3-compressed recording), it doesn't quite offer the same levels of fidelity as the recently-reviewed Tascam DR-22WL.

This newer competitor offers a touch more treble insight and low-frequency depth (better capsules?) and handling noise is lower. So much as touch the H2n, conversely, and its plastic casing responds with a hollow 'thrum' that spoils your wanted sounds. Handheld use isn't recommended for this reason; you really need to mount a H2n on a tripod and leave well alone.

Another problem is that if you're using a standard foam windshield – essential for outdoor use – the mode control and menu button are inaccessible. But the H2n is easy to use, effective, a lot of fun, and well worth the money. ●

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WORLD CLASSICS

Here is our list of the great and good from audio's glorious past, products that have earned their place in hi-fi history. You'll also see some oddities which aren't classic as such, but are great used buys. The year of introduction is given, alongside the original UK launch price.

TURNTABLES

EAT FORTE 2009 £12,500
Lavishly finished two box, two motor turntable with gorgeous Ikeda 407 tonearm bundled. Exceptionally stable and unfussy performer with a relaxed but highly enjoyable gait.



FUNK FIRM VECTOR II 2009 £860
Innovative engineering gives a nimble, pacey and musical sound that's one of the best at the price.

REGA P2 2008 £300
Excellent value for money engineering, easy set up and fine sound.

MCINTOSH MT10 2008 £8,995
Big, expensive, controversially styled and glows more than some might consider necessary, but an astonishingly good performer.

REGA P3-24 2008 £405
Seminal affordable audiophile deck with fine bundled tonearm. Tweakable, and really sings with optional £150 outboard power supply.

ACOUSTIC SOLID ONE 2007 £4,050
Huge turntable, both in terms of sheer mass and sonic dynamics. Fit up to three arms and enjoy, just don't damage your back moving it...

AVID VOLVERE SEQUEL 2007 £4,600
Stylish high end vinyl spinner with industrial strength build quality and a sound to match. Sound is edge-of-the-seat stuff.

MICHELL GYRODEC SE 2005 £1,115
Design icon with superlative build. Sound is beautifully smooth, effortless and exceptionally expansive.

MARANTZ TT-15S1 2005 £1,299
Cracking all in one deck/arm/cartridge combination, this must surely be the best sound/plug and play package at this price point.

MICHELL TECNODEC 2003 £579
Superb introduction to Michell turntables - on a budget. Top quality build and elegant design mean it's still the class of the mid-price field.



MICHELL ORBE 1995 £2,500
The top Michell disc spinner remains a superbly capable all rounder with powerful, spacious sound that's delicate and beguiling.

SME MODEL 10A 1995 £4,700
Exquisitely engineered deck and SME V tonearm combo that's an extremely accomplished performer with classical music.

LINN AXIS 1987 £253
Cut-price version of the Sondek with LVX arm. Elegant and decently performing package. Later version with Akito tonearm better.

TECHNICS SL-P1200 1987 £800
CD version of the Technics SL-1200 turntable. Massively built to withstand the rigours of 'pr' use and laden with facilities - a great eighties icon.

ROKSAN XERXES 1984 £550
Super tight and clean sound, with excellent transients. Less musical than the Sondek, but more neutral. Sagging plinth top-plates make them a dubious used buy.

DUAL CS505 1982 £75
Simple high quality engineering and a respectable low mass tonearm made for a brilliant budget buy. Polished, smooth and slightly bland sound.

MICHELL GYRODEC 1981 £599
Thanks to its stunning visuals, this bold design wasn't accorded the respect it deserved. Clean, solid and architectural sound.

TOWNSHEND ROCK 1979 £ N/A
Novel machine has extremely clean and fluid sound. Substantially modified through the years, and capable of superb results even today.

MARANTZ TT1000 1978 £ N/A
Beautiful seventies high end belt drive with sweet and clean sound. Rare in Europe, but big in Japan.



REGA PLANAR 3 1978 £79
Brilliantly simple but clean and musical performer, complete with Acos-derived S-shaped tonearm. 1983 saw the arrival of the RB300, which added detail at the expense of warmth. Superb budget buy.

SONY PS-B80 1978 £800
First outing for Sony's impressive 'Biotracer' electronic tonearm. Built like a tank with a clean and tidy sound, albeit lacking involvement. Scarily complicated and with no spares support - buy with caution!

TRIO LO-7D 1978 £600
The best 'all-in-one' turntable package ever made. Clean, powerful and three-dimensional sound, ultimately limited by the tonearm.

ADC ACCUTRAC 4000 1976 £300
Bonkers 1970s direct drive that uses an infra red beam to allow track selection and programming. More of a visual and operational delight than a sonic stunner.

PIONEER PLC-590 1976 £600
Sturdy and competent motor unit that performs well with a wide range of tonearms. Check very thoroughly before buying due to electronic complexity and use of some now-obsolete ICs.

PIONEER PL12D 1973 £36
When vinyl was the leading source, this bought new standards of noise performance and stability to the class, plus a low friction S-shaped tonearm. Later PL112D was off the pace compared to rivals.



TECHNICS SP10 1973 £400
Seminal Japanese engineering. Sonics depend on plinths, but a well mounted SP10/II will give any modern a hard time, especially in respect of bass power and midband accuracy.

LINN SONDEK LP12 1973 £86
For many, the Brit superdeck; constant mods meant that early ones sound warmer and more lyrical than modern versions. Recent 'SE' mods have brought it into the 21st century, albeit at a price.

ARISTON RD11S 1972 £94
Modern evolution of Thorens' original belt drive paradigm, Scotland's original super-deck was warm and musical, albeit soft. Still capable of fine results today.

GOLDRING Lenco GL75 1970 £15.6S
Simple, well engineered motor unit with soft, sweet sound and reasonable tonearm. Good spares and servicing support even today.

GARRARD 301/401 1953 £19
Tremendously strong and articulate with only a veiled treble to let it down.



THORENS TD124 1959 £ N/A
The template for virtually every 1970s 'superdeck', this iconic design was the only real competition for Garrard's 301. It was sweeter and more lyrical, yet lighter and less impactful in the bass

TONEARMS

REGA RB251 2009 £136
Capable way past its price point, the new 3-point mount version of the classic RB250 serves up a taut and detailed sound. A little lean for some tastes, but responds well to rewiring and counter-weight modification.

HELIUS OMEGA 2008 £1,595
Stylish and solid lump of arm with fabulous build quality, that turns in a dynamic and weighty performance.

AUDIO ORIGAMI PU7 2007 £1,300
The classic Syrinx PU3 updated to spectacular effect. Hand made to order, with any mass, length and colour you care for. Fit, finish and sound truly impressive.



GRAHAM PHANTOM 2006 £3,160
Sonically stunning arm with magnificent bass dexterity and soundstaging. Build quality up to SME standards, which is really saying something!

TRI-PLANAR PRECISION 2006 £3,600
Immaculate build, exquisite design and one of the most naturally musical and lucid sounds around.

MICHELL TECNOARM A 2003 £442
Clever reworking of the Rega theme, using blasting, drilling and rewiring!

SME 309 1989 £767
Mid-price SME comes complete with cost-cut aluminium armtube and detachable headshell. Tight, neutral sound with good tonality, but lacks the IV's pace and precision.

NAIM ARO 1987 £1,425
Charismatic unipivot is poor at frequency extremes but sublime in the midband; truly emotive and insightful.

SME SERIES V 1987 £2,390
Vice-like bass with incredible weight, ultra clear midband and treble astound, although some don't like its matter of factness!

NAIM ARO 1986 £875
Truly endearing and charismatic performer - wonderfully engaging mid-band makes up for softened frequency extremes.



ALPHASON HR100S 1981 £150
First class arm, practically up to present-day standards. Buy carefully, though, as there is no service available now. Totally under priced when new, exceptional.

SME SERIES III 1979 £113
Clever variable mass design complete with Titanium Nitride tube tried to be all things to all men, and failed. Charming nonetheless, with a warm and inoffensive sound.

TECHNICS EPA-501 1979 £ N/A
Popular partner for late seventies Technics motor units. Nice build and Titanium Nitride tube can't compensate for middling sound.

LINN ITTOK LVII 1978 £253
Japanese design to Linn specs made for a musical, rhythmic sound with real dynamics. The final LVIII version worth seeking out.

AUDIO TECHNICA AT 1120 1978 £75
Fine finish can't compensate for this ultra low mass arm's limited sonics - a good starter arm if you've only got a few quid to spend.

HADCOCK GH228 1976 £46
Evergreen unipivot with lovely sweet, fluid sound. Excellent service backup.

ACOS LUSTRE GST-1 1975 £46
The archetypal S-shaped seventies arm; good, propulsive and involving sound in its day, but ragged and undynamic now.

SME 3009 1959 £18
Once state of the art, but long since bettered. Musical enough, but weak at frequency extremes and veiled in the midband. Legendary serviceability and stunning build has made it a cult, used prices unjustifiably high.

PHONO STAGES

CREEK OBH-8 SE 1996 £180
Punchy, rhythmic character with oodles of detail makes this a great budget audiophile classic. Partner with a Goldring G1042 for an unbeatable budget combination.

MICHELL ISO 1988 £ N/A
This Tom Evans-designed black box started the trend for high performance offboard phono stages. Charismatic, musical and punchy - if lacking in finesse.



LINN LINNK 1984 £149
Naim-designed MC phono stage built to partner the original Naim NAIT - yes, really! Fine sound, although off the pace these days.

INTEGRATED AMPLIFIERS

NAIM NAIT XS 2009 £1,250
With much of the sound of the Supernait at half the price, this is powerful, articulate and smooth beyond class expectations.

MUSICAL FIDELITY PRIMO 2009 £7,900
Seriously expensive, but one listen explains why. Wonderfully exuberant sound that can only come from a top quality tube design.

SUGDEN A21A S2 2008 £1,469
Crystalline clarity, dizzying speed and forensic detailing. Power limited so needs sensitive speakers.

CREEK OBH-22 2008 £350
Brilliant value budget passive, with remote control, mute and input switching, plus an easy, a neutral sound.

CAMBRIDGE 840A V2 2007 £750
Version 2 addresses version 1's weaknesses to turn in a mightily accomplished performance, offering power, finesse and detail.

SUGDEN IA4 2007 £3,650
Goody amount of Class A power, icy clarity and a breathtakingly fast, musical sound make this one of the very best super-integrateds.

NUFORCE P-9 2007 £2,200
Impressive two box preamp with superb resolution and an engaging sound.

MELODY PURE BLACK 101D 2007 £3,295
The clarity and openness of valves plus firm grip and fine detail make this a preamplifier masterclass.

AUDIOLAB 8000S 2006 £400
In another life, this sold for three times the price, making it a stand-out bargain now. Very clean, powerful and tidy sound.

MCINTOSH MA6800 1995 £3735
Effortlessly sweet, strong and powerful with semi-styling to match.

DELTEC 1987 £1900
Fast, dry and with excellent transients, this first DPA integrated is the real deal for eighties obsessives. Ridiculously punchy 80W per channel from a tiny, half-size box. Radical, cool and more than a little strange.

EXPOSURE VII/VIII 1985 £625
Seminal pre-power, offering most of what Naim amps did with just that little bit extra smoothness. Lean, punchy and musical.



AUDIOLAB 8000A 1985 £495
Smooth integrated with clean MM/MC phono stage and huge feature count. Extremely reliable, too. Post '93 versions a top used buy.

VTL MINIMAL/50W MONOBLOCK 1985 £1,300
Rugged, professional build and finish allied to a lively and punchy sound (albeit with limited power) make them an excellent used buy.

MUSICAL FIDELITY A1 1985 £350
Beguiling Class A integrated with exquisite styling. Questionable reliability.

MISSION CYRUS 2 1984 £299
Classic 1980s minimalism combines arresting styling with clean, open, lively sound. Further upgradeable with PSX power supply.



NAIM NAIT 1984 £350
Superb rhythms and dynamics make it truly musical, but tonally monochromatic. Fine phono stage, very low power.

CREEK CAS4040 1983 £150
More musical than any budget amp before it; CAS4140 loses tone controls, gains grip

MYST TMA3 1983 £300
Madcap eighties minimalism, but a strong and tight performer all the same.

ROTEL RA-820BX 1983 £139
Lively and clean budget integrated that arguably started the move to minimalism.

NAD 3020 1979 £69
Brilliantly smooth, sweet and punchy at the price and even has a better phono stage than you'd expect. The archetypal budget super-amp.

ROGERS A75 1978 £220
Lots of sensible facilities, a goodly power output and nice sound in one box. The later A75II and A100 versions offered improved sonics and were seriously sweet.

A&R A60 1977 £115
Sweet and musical feature-packed integrated; the Audiolab 8000A remains a classic.



SUGDEN C51/P51 1976 £130
Soft sounding early Sugden combo with a plethora of facilities and filters. A sweet and endearing performer but lacking in power and poor load driving ability.

SUGDEN A21 1969 £ N/A
Class A transistor integrated with an eminently likeable smoothness and musicality. Limited inputs via DIN sockets.

ROGERS CADET III 1965 £34
Sweet sounding valve integrated, uses ECL86 output valves, even has a half useable phono stage, sweet, warm a good introduction to valves

CHAPMAN 305 1960 £40
Smooth pre/power combo with a sweet and open sound. Not quite up to Leak/Quad standards but considerably cheaper secondhand.

POWER AMPLIFIERS

ELECTROCOMPANET NEMO 2009 £4,995 (EACH)

Norwegian power station as cool as a glacier tonally, yet impresses with sheer physicality and fleetness of foot. 600W per channel.

NUFORCE REFERENCE 9SE V2 2006 £1,750
Brilliant value for money monoblocks with massive power and super-clean, three dimensional sound.

QUAD II-80 2005 £6,000 PER PAIR

Quad's best ever power amplifier. Dramatic performer with silky but dark tonality, blistering dynamics, serious power and compellingly musical sound.

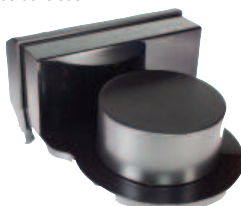


QUAD 909 2001 £900
Current-dumper has a smooth and expansive character with enough wallop to drive most loads. Not the most musical, but superb value all the same.

NAIM NAP 500 2000 £17,950
Flagship amplifier will drive just about any speaker with ease. Factor in the company's trademark pace, rhythm and timing and it all adds up to one effortlessly musical package.

MARANTZ MODEL 9 1997 £8000
Authentic reproduction monoblocks still more than cut the sonic mustard. Highly expensive and highly sought after.

MICHELL ALECTO 1997 £1989
Crisp, clean and beautifully controlled with gorgeous styling. Partnered with the £1650 Orca this sounds delicious!



MUSICAL FIDELITY XA200 1996 £1000
200W of sweet smooth transistor stomp in a grooved tube! Under-rated oddity.

PIONEER M-73 1988 £1,200
Monster stomp from this seminal Japanese power amplifier, complete with switchable Class A and Class B operation. Clean, open and assured sounding, albeit a tad behind the pace on high speed dance music. Rosewood side cheeks and black brushed aluminium completes the experience.

KRELL KMA100 II 1987 £5,750
Monoblock version of the giant KSA-100 is one of the seminal 80s transistor power amplifiers. Massive wallop allied to clean and open Class A sound makes this one of the best amplifiers of its type.

RADFORD STA25 RENAISSANCE 1986 £977
This reworking of Radford's original late sixties design was possessed of a wonderfully rich, old school valve sound with enough power (25W) and lots of subtlety.

QUAD 405 1978 £115
The first of the current dumpers is a capable design with smooth, effortless power and a decently musical sound. 606 and 707 continue the theme with greater detail and incision.

HH ELECTRONICS TPA-50D AMPLIFIERS 1973 £110
Simple design with easily available components, solid build quality and fine sound make for a surprisingly overlooked bargain

LECSON AP1 1973 £ N/A
Madcap cylindrical styling alluded to its 'tower of power' pretensions, but it wasn't. Poor build, but decently clean sounding when working.

QUAD 303 1968 £55
Bullet proof build, but woolly sound. Off the pace, but endearing nonetheless. Some pipe smoking slipper wearers swear by them!

LEAK STEREO 20 1958 £31
Excellent workaday classic valve amplifier with decent power and drive. Surprisingly modern sounding if rebuilt sympathetically. Irrepressibly musical and fluid.



LEAK STEREO 60 1958 £N/A
Leak's biggest valve power amp offers 35 Watts per channel and more low end welly than the smaller Stereo 20. Despite concerns over reliability rarity value means high price.

QUAD II 1952 £22
The all-time classic valve amplifier, with a deliciously fluid and lyrical voice. In other respects though, it sounds hopelessly dated. Low power and hard to partner properly



LEAK POINT ONE, TL10, TL12.1, TL12 PLUS 1949 £28
Early classics that are getting expensive. Overhauling is de rigueur before use, using original parts if possible. Surprisingly crisp and musical. Deeply impressive in fine fettle.

PRE AMPLIFIERS

AUDIOLAB 8000C 1991 £499
Tonally grey but fine phono input and great facilities make it an excellent general purpose tool.



CROFT MICRO 1986 £150
Budget valve pre-amp with exceptionally transparent performance.

CONRAD JOHNSON MOTIV MC-8 1986 £2,500
Minimalist FET-based preamplifier is brilliantly neutral and smooth with a spry, light balance in the mould of Sugden. Something of a curio, but worthwhile nonetheless.

AUDIO RESEARCH SP-8 1982 £1,400
Beautifully designed and built high end tube pre-amplifier with deliciously sweet and smooth sound. Not the last word in incision or grip.

LINN LK-1 1986 £499
A brave attempt to bring remote controlled user-friendliness to hair-shirt audiophile hi-fi. Didn't quite work, but not bad for under £100.

NAIM NAC 32.5 1978 £ N/A
Classic high end pre. Brilliantly fast and incisive sound that's a joy with vinyl but a tad forward for digital.

LECSON AC-1 1973 £ N/A
Amazing styling courtesy of Allan Boothroyd can't disguise its rather cloudy sound, but a design classic nonetheless.

QUAD 33 1968 £43
Better than the 22, but Quad's first tranny pre isn't outstanding. Responds well to tweaking/ rebuilding though...



LEAK POINT ONE STEREO 1958 £ N/A
Good for their time, but way off the pace these days. Use of EF86 pentode valve for high gain rules out ultra performance. Not the highest-fi!

QUAD 22 1958 £25
The partner to the much vaunted Quad II mono-blocks - cloudy and vague sound means it's for anacrophiles only.

LOUDSPEAKERS

WHARFEDALE DIAMOND 10.3 2010 £290
Great small standmounters for audiophiles on a budget; dry punchy sound with impressive sound-staging at the price.



YAMAHA SOAVO 1.1 2009 £3,000
Musical, transparent with impressive dynamics and cohesion. Excellent build and finish.

USHER BE-10 2009 £10,500
Clever high end moving coil design with immense speed and dizzying clarity allied to epic punch. Needs the best ancillaries to fly, though...



SPENDOR A5 2009 £1,695
Multi-talented floorstanders with generous scale and punch and Spendor's classic mid-range detail. Deliver a sound that thoroughly engages whatever you care to play.

MONITOR AUDIO PL100 2008 £2,300
The flagship 'Platinum' series standmounter has a lovely warm and delicate sound with superlative treble.



MARTIN LOGAN SOURCE 2008 £1,600
Brilliant entry level electrostatics, giving a taste of loudspeaker esoterica for the price of most moving coil boxes. Tremendous clarity, evenness and delicacy, although not the world's most powerful sound.

PMC OB11 2008 £2,950
Cleverly updated floorstanders give scale and solidity in slim and well finished package.

ISOPHON GALILEO 2007 £2,100
Big standmounters that really grip the music and offer quite startling dynamics and grip.

ONE THING AUDIO ESL57 2007 £1,450
One Thing Audio's modifications keep the good old ESL57 at the very top of the game.

MOWGAN AUDIO MABON 2007 £3,995
Massively capable loudspeakers that offer dynamics, scale and clarity in an elegantly simple package. Wide range of finishes, too.

B&O BEOLAB 9 2007 £5,000
Technically impressive and visually striking loudspeakers with sound quality that more than matches their looks.



ISOPHON CASSIANO 2007 £12,900
Drive units featuring exotic materials allied to superlative build quality result in an immensely capable loudspeaker. Not an easy load to drive, however.

B&W 686 2007 £299
Baby standmounters offer a sophisticated and mature performance that belies both their dimensions and price tag.

QUAD ESL-2905 2006 £5,995
The old 989 with all the bugs taken out, this gives a brilliantly neutral and open sound like only a top electrostatic can; still not a natural rock loudspeaker, though.

B&W 801D 2006 £10,500
In many respects, the ultimate studio monitor; dazzling clarity and speed with commanding scale and dynamics.



REVOLVER CYGNIS 2006 £5,999
Revolver pull out all the stops and show what they can do with this magnificent flagship loudspeaker. A superb monitor that is like a mini B&W 801D in many ways.

USHER BE-718 2007 £1,600
Beryllium tweeters work superbly, allied to a fast and punchy bass driver. The result is subtle, smooth and emotive.

USHER S-520 2006 £350
Astonishingly capable budget standmounters that offer detail and dynamics well beyond their price and dimensions.

ACOUSTIC ENERGY AE1 CLASSIC 2006 £845
Brilliantly successful remake of an iconic design; not flawless, but surely one of the most musical loudspeakers ever made.



MISSION X-SPACE 1999 £499
The first mass production sub and sat system using NXT panels is a sure-fire future classic - not flawless, but a tantalisingly unboxy sound nevertheless!

MISSION 752 1995 £495
Cracking Henry Azima-designed floorstanders combined HDA drive units and metal dome tweeters with surprisingly warm results. Benign load characteristics makes them great for valves.

TANNOY WESTMINSTER 1985 £4500
Folded horn monsters which sound good if you have the space. Not the last word in tautness but can drive large rooms and image like few others.



CELESTION SL6 1984 £350
Smallest two way design complete with aluminium dome tweeter and plastic mid-bass unit set the blueprint for nineteen eighties loudspeakers. Very open and clean sounding, albeit course at high frequencies and limp in the bass. Speakers would never be the same again...

HEYBROOK HB1 1982 £130
Peter Comeau-designed standmounters with an amazingly lyrical yet decently refined sound. Good enough to partner with very high end ancillaries, yet great with budget kit too. A classic



QUAD ESL63 1980 £1200
An update of the ESL57, with stiffer cabinets. Until the 989, the best of the Quad electrostatics.

MISSION 770 1980 £375
Back in its day, it was an innovative product and one of the first of the polypropylene designs. warm, smooth, clean and powerful sound,

ACOUSTIC RESEARCH AR18S 1978 £125
Yank designed, British built loudspeaker became a budget staple for many rock fans, thanks to the great speed from the paper drivers, although finesse was most definitely not their forte...

YAMAHA NS1000 1977 £532
High tech Beryllium midband and tweeter domes and brutish 12" woofers in massive sealed mirror image cabs equals stunning transients, speed and wallop allied to superb transparency and ultra low distortion. Partner carefully!



JR 149 1977 £120
Cylindrical speaker was ignored for decades but now back in fashion! Based on classic KEF T27/B110 combo as seen in the BBC LS3/5a. Doesn't play loud, needs a powerful transistor amplifier, but has clarity and imaging,

KEF R105 1977 £785
Three way Bextrene-based floorstander gave a truly wideband listen and massive (500W) power handling. A very neutral, spacious and polite sounding design, but rhythmically well off the pace.

SPENDOR BC1 1976 £240
Celestion HF1300 tweeter meets bespoke Spendor Bextrene mid-bass unit. The result is a beautifully warm yet focussed sound. A little bass bloom necessitates careful low-stand mounting.



IMF TLS80 1976 £550
Warm and powerful 1970s behemoth with transmission loading and a mixture of KEF and Celestion drive units. Impressively physical wideband sound but rhythms not a forte.

HH ELECTRONICS TPA-50D AMPLIFIERS 1973 £110
Simple design with easily available components, solid build quality and fine sound make for a surprisingly overlooked bargain. Not exactly stylish, however.

BBC LS3/5A 1972 £88
Extremely low colouration design is amazing in some respects – articulation, stage depth, clarity – and useless in others (both frequency extremes). Came in wide variety of guises from various manufacturers building it under licence.

LEAK SANDWICH 1961 £39 EACH
Warm sounding infinite baffle that, with a reasonably powerful amplifier can sound quite satisfying.

QUAD ESL57 1956 £45 EACH
Wonderfully open and neutral sound puts box loudspeakers to shame. Properly serviced they give superb midband performance, although frequency extremes less impressive. Ideally, use in stacked pairs or with subwoofers and supertweeters.

SYSTEMS

MERIDIAN SOOLOOS 2.1 2010 £6,990
Crisp styling, bright, colourful touchscreen, plus excellent search facilities. This is one hard disk music system with a difference. Best partnered to Meridian active loudspeakers.



NAIM UNITIQUE 2010 £995
Great little half width one-box system with truly impressive sound allied to a wealth of source options.

ARCAM SOLO MINI 2008 £650
Half the size and two-thirds the price of a full-sized Solo, the Mini gives very little away in terms of performance to its bigger brother.

MERIDIAN F80 2007 £1,500
Fantastically built and versatile DVD/CD/DAB/FM/AM unit, designed in conjunction with Ferrari. Ignore nay-sayers who sneer that it isn't a 'proper' hi-fi product. Just listen.

SHANLING MC-30 2007 £650
Quite possibly the cutest all-in-one around with fine performance from the CD player, tuner and MP3 player input. Very low power, though.



AURA NOTE PREMIER 2007 £1,500
Lovely shiny CD/tuner/amplifier with fine sound quality and dynamic abilities.



MARANTZ 'LEGEND' 2007 £22,000
The combination of SA-7S1 disc player, SC-7S2 preamp and MA-9S2 monoblocks delivers jaw-dropping performance.

ARCAM SOLO NEO 2006 £1,100
Excellent all-in-one system, with a warm, smooth and balanced sound to match the features and style.

PEACHTREE AUDIO IDECCO £1,000
Excellent sounding iPod dock, impressive DAC and fine amplifier section make this an excellent one box style system.



TUNERS

ARCAM FMJ T32 2009 £600
Excellent hybrid FM/DAB+ tuner with a smooth, engaging sound. Factor in its fine build and it's a super value package.



MAGNUM DYNALAB MD-100T 2006 £1,895
One of the best ways to hear FM that we know; superbly open and musical sound in a quirky but characterful package.

MYRYAD MXT4000 2005 £1,000
Sumptuous sound and top-notch build quality make for a tempting AM/FM package. Warm and richly detailed on good-quality music broadcasts.

NAIM NAT03 1993 £595
The warm, atmospheric sound is further proof of Naim's proficiency with tuners.

CREEK CAS3140 1985 £199
Excellent detail, separation and dynamics - brilliantly musical at the price. T40 continued the theme...

QUAD FM4 1983 £240
Supreme ergonomics allied to a pleasingly lyrical sound with plenty of sweetness and detail made this one of the best tuners around upon its launch.



NAD 4040 1979 £79
Tremendously smooth and natural sound allied to low prices and good availability make this budget analogue esoterica.

MARANTZ ST-8 1978 £353
Marantz's finest radio moment. Warm, organic sound plus an oscilloscope for checking the signal strength and multipath.

YAMAHA CT7000 1977 £444
Combines sleek ergonomics, high sensitivity and an explicit, detailed sound.

SONY ST-5950 1977 £222
One of the first Dolby FM-equipped tuners, a format that came to nought. Still, it was Sony's most expensive tuner to date, and boasted good sound quality with brilliant ergonomics.



ROGERS T75 1977 £125
Superb mid-price British audiophile design, complete with understated black fascia. Smooth and sweet with fine dimensionality.

SANSUI TU-9900 1976 £300
A flagship Japanese tuner. It boasts superlative RF performance and an extremely smooth and lucid sound.



TECHNICS ST-8080 1976 £180
Superb FM stage makes for a clean and smooth listen.

REVOX B760 1975 £520
The Revox offers superlative measured performance although the sound isn't quite as staggering as the numbers. Fine nonetheless, and surely the most durable tuner here?

SEQUERRA MODEL 1 1973 £1300
Possibly the ultimate FM tuner. Massive in terms of technology, size and features dedicated to extracting every ounce of performance from radio, including impressive multi-purpose oscilloscope display.

LEAK TROUGHLINE 1956 £25
Series I an interesting ornament but limited to 88-100MHz only. II and III are arguably the best-sounding tuners ever. Adaptation for stereo easy via phono multiplex socket. Deliciously lucid with true dimensionality.

HEADPHONE AMPLIFIERS

GRAHAM SLEE NOVO 2009 £255

Dynamic headphone amplifier with a great sense of timing. Crisp, clear treble and warm midrange gives an involving sound.



MUSICAL FIDELITY X-CAN V8 2008 £350

Open and explicitly detailed sound plus serious bass wallop. A great partner for most mid-to-high end headphones.

CD PLAYER/RECORDERS

MUSICAL FIDELITY TRIVISTA 2002 £4000

When playing SACDs, the sweetest, most lucid and lyrical digital disc spinner we've heard. Old school stereo, pure DSD design. CD sound is up in the £1000 class, too! Future classic.

MARANTZ SA-1 2000 £5,000

The greatest argument for SACD. This sublime Ken Ishiwata design is utterly musically convincing with both CD and SACD, beating most audiophile CD spinners hands down.



SONY MDS-JE555ES 2000 £900

The best sounding MD deck ever, thanks to awesome build and heroic ATRAC-DSP Type R coding.

PIONEER PDR-555RW 1999 £480

For a moment, this was the CD recorder to have. Clean and detailed.

MARANTZ DR-17 1999 £1100

Probably the best sounding CD recorder made; built like a brick with a true audiophile sound and HDCD compatibility.



CAMBRIDGE AUDIO CD4SE 1998 £200

A touch soft in the treble and tonally light, but outstanding in every other respect.

SONY TCD-8 DATMAN 1996 £599

Super clean sound makes this an amazing portable, but fragile.

LINN KARIK III 1995 £1775

The final Karik was a gem. Superb transport gives a brilliantly tight, grippy dynamic sound, albeit tonally dry.

NAIM CDS 1990 £ N/A

Classic Philips 16x4 chipset with serious attention to power supplies equals grin-inducing sonics.

MARANTZ CD73 1983 £700

A riot of gold brushed aluminium and LEDs, this distinctive machine squeezed every last ounce from its 14x4 DAC -super musical



MERIDIAN 207 1988 £995

Beautifully-built two-box with pre-amp stage. Very musical although not as refined as modern Bitstream gear. No digital output.

SONY CDP-R1/DAS-R1 1987 £3,000

Sony's first two boxer was right first time. Tonally lean, but probably the most detailed and architectural sounding machine of the eighties.

CAMBRIDGE AUDIO CD1 1986 £1500

Inspired Stan Curtis redesign of Philips CD104, complete with switchable digital filter. Lean but tight and musical performer.



MERIDIAN MCD 1984 £600

The first British 'audiophile' machine was a sweeter, more detailed Philips CD100. 14x4 never sounded so good, until the MCD Pro arrived a year later.

SONY CDP-701ES 1984 £890

Sony's first bespoke audiophile machine used a 16x2 DAC to provide a clinically incisive sound; supreme build quality allied to the pure unadulterated luxury of a paperback-sized remote control.

YAMAHA CD-X1 1983 £340

Nicely built 16x2 machine with a very sharp and detailed sound; sometimes too much so. Excellent ergonomics, unlike almost every other rival of the time.

SONY CDP-101 1982 £800

The first Japanese CD spinner was powerful and involving. Brilliant transport more than compensated for 16x2 DAC, and you even got remote control!



ANALOGUE RECORDERS

AIWA XD-009 1989 £600

Aiwa's Nak beater didn't, but it wasn't half bad nonetheless. Massive spec even included a 16x4 DAC!

NAKAMICHI CR-7E 1987 £800

The very best sounding Nakamichi ever - but lacks the visual drama of a Dragon.



SONY WM-D6C 1985 £290

Single capstan transport on a par with a Swiss watch, single rec/replay head better than most Naks. Result: sublime.

PIONEER CTF-950 1978 £400

Not up to modern standards sonically, but a great symbol of the cassette deck art nonetheless.

YAMAHA TC-800GL 1977 £179

Early classic with ski-slope styling. Middling sonics by modern standards, but cool nonetheless!

SONY TC-377 1972 £N/A

A competitor to the Akai 4000D open reel machine, the Sony offered better sound quality and is still no slouch by modern standards

REVOX A77 1968 £145

The first domestic open reel that the pros used at home. Superbly made, but sonically off the pace these days.

COMPACT DISC TRANSPORTS

ESOTERIC P0 1997 £8,000

The best CD drive bar none. Brilliantly incisive, ridiculously over engineered.

TEAC VRDS-T1 1994 £600

Warm and expansive sound made this a mid price hit. Well built, with a slick mech.

KENWOOD 9010 1986 £600

The first discrete Jap transport was beautifully done and responds well to re-clocking.

DACs

DCS ELGAR 1997 £8500

Extremely open and natural performer, albeit extremely pricey - superb.

DPA LITTLE BIT 3 1996 £299

Rich, clean, rhythmic and punchy sound transforms budget CD players.

CAMBRIDGE AUDIO DAC MAGIC 1995 £99

Good value upgrade for budget CD players with extensive facilities and detailed sonics.

PINK TRIANGLE DACAPO 1993 £ N/A

Exquisite; the warmest and most lyrical 16bit digital audio we have ever heard.

QED DIGIT 1991 £90

Budget bitstream performer with tweaks aplenty. Positron PSU upgrade makes it smooth, but now past it.

CABLES

MISSING LINK CRYO REFERENCE 2008
£495/0.5M

High end' interconnects, with deliciously smooth, open and subtle sound without a hint of edge.

TECHLINK WIRES XS 2007 £20

Highly accomplished interconnects at an absurdly low price. Stunning value for money.

VDH ULTIMATE THE FIRST 2004 £250

Carbon interconnects that help you forget the electronics and concentrate on the music. Miraculous transparency. Tight and tuneful bass mixed with air and space.



WIREWORLD OASIS 5 2003 £99/M

Excellent mid-price design with a very neutral, silky and self-effacing sound. Superb value for money.

TCI CONSTRICTOR 13A-6 BLOCK 2003 £120

Top quality 'affordable' mains outlet block, with fine build and good sonics. Well worth the extra over standard high street specials, which sound coarse and two-dimensional by comparison.

Precious Diamond

Tellurium Q's latest loudspeaker cable takes their range to another level, says Jon Myles.

Tellurium Q has been on an upward trajectory since launching its first product just five years ago. The natural coherence and transparency of its Black loudspeaker cable raised eyebrows with reviewers and listeners around the world – as did the company's absolute refusal to reveal any details about its construction.

The reason for the secrecy was two-fold; for a start Tellurium Q founder and designer Geoff Merrigan didn't want anyone else copying their work and secondly he was confident enough in their ability to allow customers to simply try out the cables and make their own mind up on how good they were without any of the technical mumbo-jumbo that surrounds some other cables.

So confident, in fact, that most Tellurium



Q dealers offer a money-back guarantee to any customers who are not completely satisfied. Not that this happens very often – which doesn't surprise me, having been blown away by their latest Ultra Silver cables earlier this year (Five Globe review, Hi-Fi World June 2015).

But now Geoff and his team have upped the ante with their latest creation – the Tellurium Q Silver Diamond which costs a not inconsiderable £804 per metre (but more of that later).

In looks it's very much like the Ultra Silver, comprising a sturdy, flat ribbon design with the conductors sheathed in a mesh braid and terminated with spades or banana plugs.

As ever, there's no indication of internal cable geometry or the materials used in the construction. Going by the name you'd probably guess there's at least some silver and probably tellurium involved. But then again, maybe not.

Whatever it is we'll never know – but as Tellurium Q say, it's ultimately the sound that matters.

SOUND QUALITY

Different cables can do different things to hi-fi systems; darken the sound, smooth out or accentuate the treble, bring subjectively heavier bass etc. The Silver Diamonds don't do any of this. To my ears they instead

act as a wide open channel between the amplifier and loudspeakers – essentially letting more of the musical information flow through.

On Jean Francaix's 'Petit Quatuor Pour Saxophones', for example, there's an incredibly expansive acoustic and lifelike presentation, with the tonal differences of the soprano, alto, tenor and baritone saxophones perfectly differentiated. The transparency and resolution of the tiniest details – even down to the intake of breath of one of the players – raised the hairs on the back of my neck. Similarly the Jesus And Mary Chain's feedback-drenched 'Psychocandy' – where the whole soundstage seemed to open up before me.

I could hear the various layers of the sound, from the booming bass drum to the highest guitar note – and everything in-between – locked absolutely correctly in its own space. Not only that, the Silver Diamonds also seem possessed of tremendous energy, transmitting all the drive of the group in full flow.

They throw a holographic soundstage. With Kraftwerk's 'Minimum-Maximum' I could place a particular synth line from 'Neon Lights' exactly one foot to the side and two feet in front of the speakers.

The more I listened, the more convinced I became that the Silver Diamonds were actually showing up many of the deficiencies in other cables by acting transparently as a conduit for the signal. As such they

allow the entire frequency spectrum to be heard in full resolution without any harshness – unless it happens to be there on the recording in the first place.

Admittedly, £800-a-metre may seem a lot to spend on a set of loudspeaker cables. But I'd say that the Silver Diamonds actually stand comparison with rivals costing significantly more, such as Nordost's Frey 2 (£1800 per metre) which – while excellent – to my ears lack some of the unforced naturalness of the Silver Diamonds.

You don't need to own the highest of high-end systems to hear the difference these cables make. During the course of the review I used them with equipment ranging from the relatively budget end of the market to components costing many thousands of pounds. Never once did they fail to improve the sound.

In fact in each case the overall effect was akin to switching from listening to a track on CD to hearing it in its full 24bit/192kHz high-resolution glory – more detail, more depth, more resolution.

CONCLUSION

Tellurium Q have surpassed themselves here. It's often said all cables colour the sound of a system to some extent, but the Silver Diamonds do it to a lesser extent than any other product I've heard so far. As such they provide an open window onto your loudspeakers, amplifier and sources. Recommended without reservation.



TELLURIUM Q SILVER DIAMOND £804 PER METRE



OUTSTANDING - amongst the best.

VERDICT

One of the most open, natural and transparent loudspeaker cables you can buy. Brings extra detail, extension and coherence to any system.

FOR

- transparency
- timing
- frequency extension
- coherence

AGAINST

- price

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Stands That Deliver

Canada's IsoAcoustics Aperta stand can really raise the performance of your loudspeakers, finds Jon Myles.



We all know stands can make a big difference to the sound quality of small loudspeakers. But what to do if you're using them on a desktop while working away on the computer or for reasons of space have to place your monitors on a sonically-unfriendly bookshelf?

Enter the IsoAcoustics Aperta LS8R line of isolation stands. Made from sculpted aluminium, the Apertas come in a range of sizes for accommodating small to medium-sized loudspeakers weighing up to 35lbs – and there's also a dedicated sub-woofer model available.

Developed by Canadian radio and TV studio design expert Dave Morrison, the stands have garnered a loyal client base among sound engineers in the pro-audio community and are now gaining a following in the domestic hi-fi market.

The stand aims to isolate the 'speaker from desktops, bookshelves or other surfaces by use of a patented suspension system. The loudspeaker itself sits on a top section which slots into a rigid base via damped legs. IsoAcoustics says

the design allows a degree of forward and back travel but resists lateral and secondary movements and oscillations. A clever integrated tilt adjustment mechanism incorporating 14 steps of height adjustment also allows the 'speaker to be angled up or down to suit the listening position (see the website at www.isoacoustics.com for more details).

SOUND QUALITY

I'll freely admit I came to the Apertas with a fair degree of scepticism. But it didn't take long for my reservations to be swept aside.

Used with a variety of small to medium loudspeakers – from Epos K1s to Spendor D1s and Neat Motive SX3s – the IsoAcoustic stands never failed to make a difference.

Placed under the K3s on an ordinary desktop and playing The Clash's 'Bankrobber Dub', at first I thought the bass had lost a little slam. But after a few minutes it soon became evident it was all present and correct, only tighter and more forceful than before without any of

the unnatural boom that was present without the stands.

Instruments higher up the scale also had more air around them – the strike of a plectrum on guitar chords sounding more insistent and less smeared. In a sense it as though the 'speakers are being given room to breathe and allow the music to flow with a more natural rhythm.

Switching to the massive orchestral power of Berlioz's 'Te Deum' the Apertas opened up the soundstage to give a better appreciation of the sheer scale of this piece. This wasn't just a subtle improvement but a clear enhancement of the sound – and one that was repeated on all forms of music ranging from small-scale acoustic jazz to bombastic hard rock.

CONCLUSION

At just £149 a pair the IsoAcoustics Apertas are an excellent product which really help get the best out of your loudspeakers.

They really do bring great sonic improvements compared to simply placing the 'speakers on a desktop or bookshelf and so come highly recommended.

**ISOACOUSTICS
APERTA £149
(A PAIR)**



OUTSTANDING - amongst the best

VALUE - keenly priced

VERDICT

A clever, compact stand which opens up the sound of small to medium-sized loudspeakers and brings a tighter low-end and more expansive treble.

FOR

- well-built
- tighten bass
- open soundstage

AGAINST

- nothing at the price

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vinyl section

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OCTOBER 2015

www.hi-fiworld.co.uk**PRO-JECT ESSENTIAL II DIGITAL TURNTABLE 82**

Pro-ject's plug-and-play turntable now includes an optical digital output.
Noel Keywood sees the light.

BOOK REVIEW 93

Paul Rigby settles down with Tapestry of Delights: The Ultimate Guide To UK Pop & Rock 1963-1976...plus your chance to win a copy.

HEED QUESTAR MC PHONOSTAGE 90

Paul Rigby tries out Heed's new Questar MC phonostage.

news

MOV MAN THING

From Music on Vinyl (www.musiconvinyl.com) Warren Zevon's self-titled 1976 release was a nasty, bitter, mean-spirited affair. Delightful because of it.

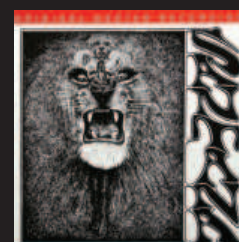
Produced by Nile Rogers, The Vaughan Brothers sees Stevie Ray and Jimmie in 'Family Style' play with blues stylings for a solid release.

Look out for Paul Simon's 'Graceland' offering poetic lyrics, a zydeco/conjunto rock combination and eclectic African flavours.

David Bowie's 'Hours'... sounded relaxed and open while using his past masterworks as a grounding and foundation.

**ABSOLUTELY FANTASTIC**

Two new releases from Fantastic Voyage (fantasticvoyagemusic.com) include the vinyl version of the 3CD set 'Sassy Sugar', a 2LP collection of Nashville-inspired rock'n'roll including tracks from Jimmy Isle and Johnny Horton. 'Classy Sugar' sources rock'n'roll from the New York scene including tracks from The Bay Bops and Bobby Darin.

**MOBILE DUO**

Two from Mobile Fidelity (www.mofi.com), this month. Santana's self-titled 1969 debut introduces a lively fusion of rock and Latin rhythms while the Spinners self-titled 1972 release was their best, offering sophisticated soul such as 'Could It Be I'm Falling In Love'.

NINJA CUTS

A top trio from Ninja Tune (ninjatune.net). From Jaga Jazzist is 'Starfire', mixing sixties TV theme-styles, cool guitar flows and angular electronica. Sublime.

Arriving with a bonus remixes disc is Andrea Triana's 'Giants' offering shmokey soul...it's all in the delivery.

Marabou State's 'Portraits' takes a Jaga Jazzist theme and adds an uptempo edge while remaining low-key. Smooth, with eight letter 'o's.

**AT THE MOVIES**

Two from this Music On Vinyl imprint includes Bear McCreary's 'Outlander' which is based on the TV series plus, from the film, 'Far From The Madding Crowd' via Craig Armstrong (both are limited, numbered editions on coloured vinyl).

ROCK IT!

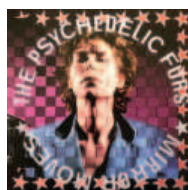
New from ageing punk rockers The Crunch is 'Brand New Brand' with their melodic, Clash-like vibes. Schultz's female backing vocals add a nice dimension (www.thecrunch.se). The first two notes of Turbowolf's new album 'Two Hands' (Spinefarm ; www.spinefarmrecords.com) sound like Yes, the next few evoke post rock...then all hell breaks loose. Heavy, heavy guitar with melodic vocals.

Next? A batch from Music on Vinyl including Living Colour's 'Stain' (1993). Dark, focused but not always hitting the target.

The Psychedelic Furs 'Mirror Moves' (1984), moved away from the band's classic sounds but offered excellent songs.

'World's Apart' was Saga's 1981 commercial breakthrough. Intelligent lyrics and prog tones with a pop core.

Black Oak Arkansas, self-titled 1971 Southern rock outing was propulsive, ugly music with a Howlin' Wolf-like delivery. Different!



ALL THAT JAZZ

New from Music on Vinyl is Branford Marsalis' take on John Coltrane's iconic 'A Love Supreme', live at Bimhuis, Amsterdam, 30 March 2003. Cultured.

Then the brilliant pianist Keith Jarrett and 'Expectations' (1972), the first LP that showed the world how devilishly talented he was. From soul-jazz to avant-garde.

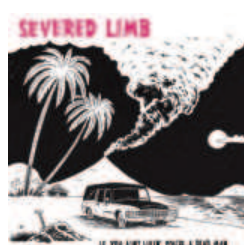
Also, Tony Williams' 'Believe It' (1975) is a hard-edged fusion outing with guest guitar Allan Holdsworth.



DAMAGED GOODS

Two from Damaged Goods (damagedgoods.co.uk) starts with Severed Limb's 'If You Ain't Livin' You're A Dead Man'. Formerly neu-punk, the group has transformed into an indie/rockabilly combo.

Cowbell's 'Skeleton Soul', sixties-like soul/rock/garage piece. Full of energy and variation that pushes boundaries.



ACE

Three eclectic offerings from Ace (www.acerecords.com) include '...Wants A Piece Of You' by Hairem (later She) - shockingly aggressive (at the time) garage rock from this all-girl band from the late sixties/early seventies.

Ex-Coasters and Flairs vocalist Young Jessie is here with 'Hit, Git & Split'. This was one of Ace's first releases and has now been remastered.

As a contrast is The Damned's 'Go!-45'. Their Chiswick singles spread over fourteen tracks including 'New Rose' and 'Smash It Up'.



...AND FINALLY

From Beggars Banquet two 'sets' from The Fall includes 'The Wonderful And Frightening World Of...' plus 'Escape Route to...' (including two 1984 singles and an EP) plus 'This Nation's Saving Grace' and 'Shtick - Yarbles Revisited' (including a Peel Session plus 'Nation' singles).

From Wah Wah (www.wah-wahsupersonic.com) comes Dorembus-Jacq-Arondel-Michalakakos and a rare slice of folk-prog from 1971 called 'Season'. Includes a 7" single.

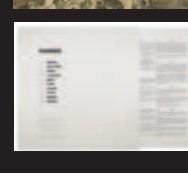
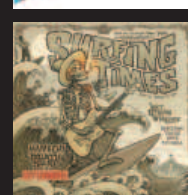
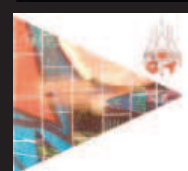
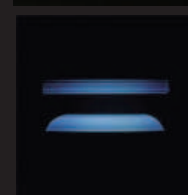
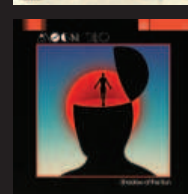
From Moon Duo 'Shadow of the Sun' (plus 7" single; Sacred Bones - www.sacredbonesrecords.com) is a modern psychedelia dark adventure. Suffocating fun.

John Metcalfe's 'The Appearance of Colour' (Realworld; www.realworldrecords.co.uk) is a tonal instrumental piece that is quietly considered, articulate and exquisitely arranged. The music thinks before it speaks.

'\GT// and 'Beats Misplaced' (Communicating Vessels; www.communicatingvessels.com) offers an insistent rock beat that feels like someone driving a slow moving truck through your bedroom wall. It will do you damage but relax because there's nothing you can do about it.

Los Plantronics' 'Surfing Times' (Jansen; www.jansenplateproduksjon.no) offers fast-paced, reverb-laden, guitar-maniac, good times with a rolling beat.

Rainer's 'Water' (Kissability; www.kissability.net) offers a cool, electronica-backed female vocal with hook-laden melodies. A sort of Texas 2.0.



White light



A shiny white budget turntable that has an optical digital output, Pro-ject's new Essential II Digital intrigues Noel Keywood.

Here's the improbable idea of a digital turntable – an idea that may well make vinyl enthusiasts shudder. I thought initially “why would anyone want to do that?”, but after time spent with Pro-ject's new Essential II Digital turntable, I get it.

In a nutshell, the Essential II

Digital has both analogue and digital outputs, the latter being for recording purposes. It means you can digitally archive your vinyl and / or load it to a portable to make the commute easier to bear. Whilst everyone else is listening to shaky MP3s, you'll be enjoying the lush sounds of analogue.

It all starts to make sense – but generating decent digital isn't easy

and neither is recording it, so hang on, I have things to say about this.

The Essential II Digital is – I think – stunningly priced, costing just £309. I'm almost baffled by this because it actually has a lot of technology on-board and was quite challenging to test – so I don't find it easy to understand how the bill of materials equates to such a low price.

There haven't been any unacceptable compromises either: it didn't bulldoze the grooves of my LPs. Far from it, the budget Ortofon OM5E cartridge fitted tracked incredibly well under test, so there will be no groove damage from mis-tracking – something I think I need to assure you about straight away. There's no point in buying a budget techno-wonder if it's going to chew up the LP collection after all, and budget cartridges can do this. But onto a basic description...

The Essential II Digital is a two speed turntable, spinning at 33 and 45 rpm. It has a good, friction free arm that isn't the best finished you'll encounter; don't expect a Rega, let alone an SME. But I don't mind simple but effective design along well tried lines – and this is what the arm gives you.

The fitted Ortofon OM5E cartridge can be described likewise: it is a well honed lightweight Moving Magnet (MM) design with elliptical stylus that tracks at a recommended 1.75 gms. And in tests it never mis-tracked once, even on torture tracks. It does have a warm sound balance, but this is likely what people new to vinyl will expect. The arm could well take a better cartridge, right up to Ortofon's top MM, the 2M Black (£400) or a good Goldring or Audio Technica.

To change speed you move the belt manually from one motor pulley diameter to another; it's as simple as that. There is an on-off switch on the left side of the plinth, near the front – a convenient location. Pro-ject supply a thin felt mat that I would

tend to change for something stickier, securing it with double-sided tape for speed stability tests; thin felt mats slip. The turntable is good enough in its performance our measurements showed, warranting a bit of extra investment in small tune-up items such as a better mat and/or disc clamp.

The motor pulley has two diameters, for 33rpm and 45rpm. To change speed the belt must be moved manually. The 15V d.c. power supply input can be seen below.



Bias is applied by a simple weight-and-string system, our shot shows here. The counterweight turns forwards or backwards to set tracking force, a common method.

Below lies the optical digital output that makes this turntable so unusual and distinctive. The analogue output is for Line inputs, not Phono inputs/stages.

There's little sign of digital-ness in the physical appearance of this product, except in the logo on the nicely finished white plinth. Pro-ject have concealed the complexity of their digital wonder in a little box at the back, slung underneath the plinth. Inside lies a complete phono stage, no less, with RIAA equalisation, so you do not – and cannot – connect up to the phono stage of an accompanying amplifier; it plugs into line inputs. This means the Essential II Digital can drive just about any amplifier – even powered Bluetooth loudspeakers if they have a reasonably sensitive input.

The phono stage doesn't have an especially high output, so volume will have to be turned up on an accompanying amplifier that lacks sensitivity. Power is supplied by an external wall-wart delivering 15V d.c.

And now onto the digital bit! All Pro-ject fit is a single optical S/PDIF output, situated next to the phono sockets – and that's it; there are no lights, switches or an electrical S/PDIF output. The optical delivers 24/96 PCM, which



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Okutsu Denko 1.5 metre mains cable (US plugs) £1195

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is higher digital quality than CD. So what to do with it?

There's seemingly little point in taking it to a DAC of any sort; you are better off using the analogue output to avoid conversion to digital and back again. However, you could conceivably do this in order to use a long optical digital cable across a lounge, to a distant DAC and amp. I ran this output through the top quality ESS Sabre32 DAC in our Oppo BDP-105D Blu-ray player and thence on to a Creek Evolution 100A feeding Castle Avon 5s to assess it – more of which later.

The most obvious use of a digital output is for recording purposes, as I mentioned earlier, but this is a tad more challenging than pressing the red Record button on a cassette deck – if you can remember them! You need a software music recording programme like Apple's Garage Band, or the free Audacity programme I use, available for Mac and PC. Then you need a device with an optical digital input, which could be a PC's sound card.

I used our trusty and very capable Furutech-ADL Esprit preamplifier, connecting its USB socket to a MacBook Pro – and this worked fine. It imposes an S/PDIF-to-USB digital conversion process, but these days there are no noise penalties; I was up and running immediately, making excellent 24/96 recordings.

What the Essential II Digital turntable has on-board that distinguishes it – and justifies the Digital moniker – is an Analogue-to-Digital Convertor, or ADC – and there are not so many of these about in hi-fi, because recording digital audio is



The turntable comes with an Ortofon OM5E moving magnet cartridge fitted. It tracked very well at 1.75gm downforce.

no simple process: check out the Audacity music editor online if you are interested.

I suspect Pro-ject will at some point fit a USB-B output instead of S/PDIF, because it is now a more common digital interface.

For measurement purposes I disconnected the cartridge, sent an analogue test signal in and took the turntable's optical digital output into our Rohde&Schwarz digital analyser – and got impressive results. Pro-ject have not skimped on all this, hoping no-one will notice. Quite the reverse in fact, their engineering is impressive.

Which is why I said earlier the £309 price is stunning – I don't know how they do this. You get turntable, cartridge, phono stage and digital convertor, which in separate units could easily cost double, or much more. Budget ADC chips can be

noisy and distorted but the one used by Pro-ject was neither; my ADC-DAC listening test showed.

SOUND QUALITY

With its analogue output connected into a Creek Evolution 100A amplifier driving Castle Avon 5s I review in this issue, I had a nice little vinyl set up. But a few issues popped up straight away. The Creek isn't sensitive so I had to crank volume right up, even to maximum at times to play very loud, because the Pro-ject has low gain.

At very high volume I detected a little motor noise coming through when playing an LP, a weak drone. Sitting 10ft back from the system I couldn't hear this. I heard the same with the silent groove of an Adjust+ test LP, by the way, a check to ensure the drone hadn't been recorded onto the disc being played.

There was absolutely no electrical hum or buzz even at full volume; the system was delightfully quiet, giving a very good impression in use.

Dropping the stylus into the groove to play Phil Collins I Don't Care Any More, from a 180gm pressing of Hello I Must Be Going, to see how well the system handled Mr Collins hitting his drum kit gave me a nice surprise. The sound was big bodied, fluid and dynamic. It was larger chested than most budget turntables in fact, giving me a big expansive sound stage with plenty of apparent depth and real power in the drums. Sounding smooth and quite dark in tone the Digital sounded gorgeously analogue and wouldn't

A wall-wart power supply provides 15V d.c. via a thin cable, so there is no hum producing a.c. anywhere near the hum sensitive cartridge and phono stage. An analogue signal cable is supplied, but not a digital optical cable. The earth must be connected, because there is no mains earth.



The New Range of Low Distortion Cables From **Black Rhodium**

Sonata VS-1 Samba VS-1



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"These feature-packed cables are a sensibly priced upgrade that will bring positive virtues to many musical styles and systems."

"Thoroughly recommended"
HI-FI Choice, January 2015



Find out more and where to buy at:
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disappoint anyone, especially those who bought it wondering what LP was all about. They'd get a shock if they'd been listening to the thin and shaky sound of MP3s!

"the Digital sounded gorgeously analogue and wouldn't disappoint anyone"

Sustained organ notes behind Phil Collins were satisfyingly steady, suggesting good speed stability, as measurement had suggested. Spinning Chopin's Nocturne, Op48, No1, confirmed this, the closing three sustained chords remaining reassuringly stable over their duration.

The big, full bodied sound suited classical and I don't think anyone could have easily criticised the lovely full tones of the English Chamber Orchestra playing Simple Symphony for Strings, from the pin sharp dynamics of plucked strings through to the strength and depth of the bassoons.

Spinning Jackie Leven's 'Some Ancient Misty Morning' from his LP 'Forbidden Songs of the Dying West' I was aware again that there was very strong projection of depth and atmosphere, to the extent that I wondered whether this little unit was benefitting in a rare manner from having the phono stage – and a good one at that – situated right at the base of the arm. There was a soothing sense of peaceful silence until the music started and Jackie's voice sprung out of the dark at me – lovely. I really liked this. The Digital sounded almost too good.

Connecting digitally via optical cable to our Oppo BDP-105D Blu-ray player showed that the analogue cable must also be in place – or an earth line – to avoid a slight mains buzz, but with this done the optical feed was silent.

Playing via the turntable's ADC into the Sabre32 DAC of the Oppo was an interesting experiment. In spite of the prodigious amount of processing involved in going to 24bit digital and back again, sound quality remained surprisingly good. It hardened up slightly, gaining a mechanical "tin can" coloration shall I say, but it was slight. I think a long optical line could well be used across a lounge to a DAC. because the

digital penalty is low.

Interestingly, when I cued up there was a slight time lag before the music stopped.

What this test tells me is that

the ADC does a pretty good job – and that's also what I heard with recordings to my MacBook Pro via Furutech's Esprit preamplifier. I got great quality with just the slightest added hardness, but absolutely no noise or muddle and the full glory of the Pro-ject Essential II Digital's

sound was preserved: impressive stuff.

CONCLUSION

The Pro-ject Essential II Digital is quite an amazing package. It gave great results, having lush sound quality from its analogue output that I found thoroughly enjoyable and entirely in keeping with expectations from LP. There was definitely no digital in this bit of the Digital!

I could almost say that of the digital output too. It sounded pretty darn good when played through the ESS Sabre32 DAC within Oppo's BDP-105D Blu-ray player.

This Digital turntable from Pro-ject isn't an idea that will make anyone shudder – quite the reverse. It is one impressive player, whichever way you look at it.

MEASURED PERFORMANCE

There was a lot to measure in this package: a turntable, arm, cartridge and – most unusually – a complete on-board phono stage with S/PDIF optical digital output, hence the name Pro-ject Essential II Digital.

The on-board analogue phono stage (with RIAA equalisation) had x52 gain, so a 5mV input delivered 260mV. This is low, enough for sensitive amplifier Line inputs (e.g. Aux, Tuner, etc) only; x100 gain is usual.

Frequency response was flat due to accurate equalisation. There is a low filter, to suppress warp signals below 20Hz. With low noise and distortion, plus high overload, Pro-ject have put design effort into this stage; it measured well.

Via the optical digital output peak

digital level (0dB) has been set at 35mV input from the cartridge, our Rohde&Schwarz UPV digital signal analyser showed, and this is correct, being the maximum output of a good Ortofon MM. Noise from the 24/96 ADC measured -96dB down – a low level – and frequency response was flat to 48kHz, so the digital side performed well. The Pro-ject's on-board ADC will outperform a typical computer ADC and will give good sound quality.

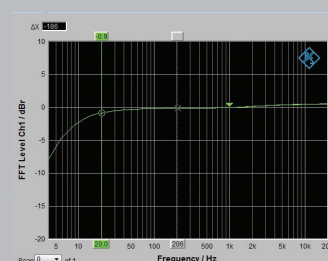
The Pro-ject Essential II Digital turntable ran at almost correct speed, its error of +0.1% being small. Speed varied little around its nominal of 3155Hz, suggesting a low wow figure. This promise was just about delivered, basic rate wow at 0.55Hz (33rpm) being very low. However, there was some flutter to mar the picture, something our spectrum analysis of demodulated speed variation components clearly shows. All the same, for a budget turntable this is still a good performance; I was expecting wow in the 0.2-0.3% region, but the Essential II Digital managed around 0.15% most of the time.

The Ortofon OM5E cartridge fitted has falling treble measurement showed and will give a warm balance, but it tracked extremely well, clearing a top torture test track of 90µm lateral.

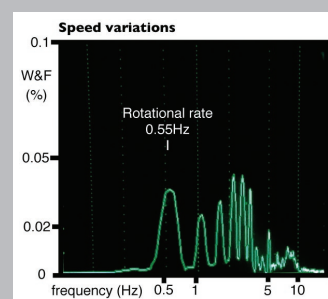
The Pro-ject Essential II Digital measured well all-round, even in difficult 'corners' such as ADC performance. It's impressive for the price. **NK**

Speed accuracy	+0.1%
Wow	0.15%
Flutter	0.05%
Total W&F weighted	0.09%

FREQUENCY RESPONSE



WOW & FLUTTER



PRO-JECT AUDIO ESSENTIAL II DIGITAL TURNTABLE £309



OUTSTANDING - amongst the best

VALUE - keenly priced

VERDICT

A great sounding budget turntable with fine on-board phono stage and useful digital output too. Impressive – a real bargain at the very low price.

FOR

- on-board phono stage
- hi-res digital output
- low price

AGAINST

- simple construction
- manual speed change
- no USB

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Take Heed

Looking for a low cost moving coil phono amplifier? Paul Rigby reviews the Heed Questar.



While sub-£300 moving magnet phono amps are commonplace, finding the same for a moving coil cartridge is a little more difficult. So Heed has done well to produce a suitable unit for this cost.

To reach this price point, though, Heed has cut its cloth. Hence, the prosaic chassis – a simple metal box – is supported by Maplin-esque feet fixed by a basic set of screws.

Powered by a wall-wart, the front of the box sports a simple power light with the usual sockets on the rear.

There are no silicon chips inside; this is an all-discrete design – usually considered to provide better quality.

Because of the chassis' long-form factor, the rear of the phono amp is short on space. Hence, the sockets are rather squeezed together. In use, my connected cables became so crowded and so difficult to site

correctly that I initially only heard one channel. After further fiddling with the cables I then heard...nothing at all!

It was only when I totally removed the outer metal tightening sheaths on the RCA connectors that I had room to force the cables home into the sockets, a teeth-grating experience.

There are no selector knobs or DIP switches on the Questar; the settings are fixed. As the tests show, the Questar is aimed at low output moving coils of around 0.2-0.5 mV and it has a high 64dB gain.

SOUND QUALITY

I began the sound test with a piece of modern classical fare via Bruce Brubaker from his new LP, 'Glass Piano', a solo piano interpretation of the works of Philip Glass, and 'Mad Rush'. This long track features a flighty sequence over a metronomic rhythm before launching into a loud

and proud section which tests the phono amp's dynamic capabilities.

I tested the Heed alongside my reference Trichord Dino Mk.3 that soars with freedom in the upper midrange area.

The Heed felt slightly claustrophobic in comparison, despite its low noise (revealed during testing). Those results also alluded to possible excessive warmth and this certainly



The sockets are rather too close together for adult fingers to manipulate decent quality cables.



There are no silicon chips in the Questar; it is an all-discrete design, this shot shows. The grey blocks are 10µF input capacitors that protect the cartridge from d.c. – a nice touch.

added to the slightly veiled response, especially in the upper mids.

That said, there was an excellent sense of low-end emphasis from the Heed during this performance. This meant that varying key pressure on the low registers from Brubaker's piano was easily recognised, making for an emotive performance.

Moving to the jazz/pop of Morgana King and 'Like A Seed' from the 1973 album 'New Beginnings' the Heed tracked the funky introductory bass with aplomb while King's rather sultry and smooth vocal delivery (a mixture of Barbara Streisand and Cleo Lane in style) was particularly suited to the unit's warm approach. Although some of the secondary percussion was a little subdued and lacking in pizzazz and the strumming guitar was rather tamed in its approach, the electric organ offered a foot-tapping presentation while the drums provided a valuable foundation to the overall track.

As the Heed seemed to be more at home with low-end and powerful music, I thought that I'd turn towards rock. In this case a very early rendition from the Electric Light Orchestra, during their particularly hairy early phase within '10538 Overture' from 'The Light Shines On Vol 2' LP recorded in 1971.

I was impressed by the Heed's instrumental separation on this track. There is a conglomeration of stringed instruments within this ditty that threatens to be presented as a tuneful lump.

The Heed did well to tease each instrument apart and into something recognisable. The more delicate aspects of this song, the rather fragile acoustic guitar pickings and secondary percussion which could easily be lost in this busy soundstage, were illuminated and could easily be tracked.

The low noise certainly aided this

welcome sonic feature. The midrange and treble side of the soundstage lacked extension but this was more than made up by the power and body of the aggressive cellos which dominated the song.

They launched at my ear with purpose, giving the track a dominating and portentous danger that threatened to overwhelm the entire song, while the lead guitar controlled the entire structure of the track, adding sonic signposts around which the rest of the music flowed. The treated, rather weedy, lead vocal needed the low noise

support to make it anywhere near understandable and here, again, the Heed scored.

CONCLUSION

This is a compact phono amp that, sonically, packs a lot in for the price. Those music fans who count classical and jazz amongst their foremost listening content will not be disappointed by the Heed but might better look elsewhere for improved value, while those attracted to rock, synth-based electronica and richly arranged pop will find much to be impressed with the Heed.



The power supply features a usefully long power cord.

MEASURED PERFORMANCE

Frequency response of the Questar wasn't flat, straying quite far from the 318µs time constant below 1kHz our analysis shows. As a result there is a lift of +1.5dB relative to treble levels and this will add warmth and body into the sound, to a degree that some may find

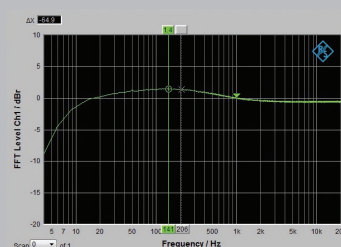
excessive. It will also re-balance bright sounding cartridges for the better – for those that have such an animal.

Heed have included a warp filter that introduces attenuation below 20Hz and -7dB attenuation at 5Hz, where most warps occur – useful. The Questar is an all-discrete design – impressive – with input blocking capacitors, likely proportioned to provide warp filtering.

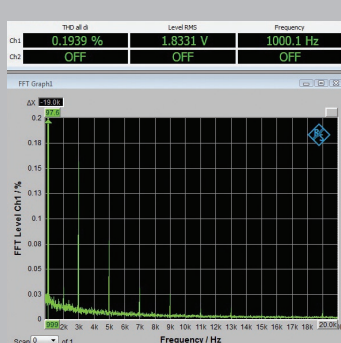
The gain of the Questar was high at x1800 (65dB), but with an output overload ceiling of just 5.5V (10V is common) this equated back to an input overload value of 3mV – fairly low. Around 10mV is a common figure.

Equivalent input noise (e.i.n.) IEC A weighted was low at 0.1µV, a value approaching that of an input transformer (0.08µV) so this is where the Heed excels. Together with high gain, this suggests the design has been aimed at low output MCs, where very low noise is essential and overload not an issue. **NK**

FREQUENCY RESPONSE



DISTORTION



Frequency response (-1dB)

	11Hz-20kHz
Distortion	0.18%
Separation (1kHz)	78dB
Noise (e.i.n., IEC A)	0.1µV
Output (max)	5.5V
Overload	3mV in/5.5V out
Gain	65dB / x1800

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VERDICT

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FOR

- compact
- low end performance
- low noise
- instrumental separation

AGAINST

- chassis design
- veiled mids
- no mono switch

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A Rich Tapestry

In the first of a new Hi-Fi World series on music-related books, Paul Rigby looks at a tome that goes that bit further than the rest.

The Tapestry Of Delights Expanded Two Volume Edition: The Ultimate Guide to UK Rock & Pop Of The Beat, R&B, Psychedelic and Progressive Eras 1963-1976

Author: Vernon Joynson

Price: £100

This A4-sized book featuring closely typed text has been created for the record collector, the music historian or the casual music fan with a broad-based interest in these genres.

It is a work of reference and not a story to be read from beginning to end. That said, there's nothing stopping you if you feel so inclined because there is much to enjoy and inform here.

The layout is set in alphabetical order and each entry follows a template. Of course some entries are larger than others, depending on the output from that artist.

Let's take a sample from a popular band, The Animals. After telling us which part of the UK the band come from, we go through the band's line-up and album listings (plus associated catalogue and label details).

There's a host of detailed notes

on each album including reissues in other countries, mono/stereo editions, US album releases and compilation information. Then the book does the same thing regarding EPs, then singles. Following is information on Animals' tracks that have appeared on other, various artist compilations.

After that, we get a detailed history of the life of the band. A selection of record cover and band images are included too.

The Animals get around five pages of space but an obscure outfit like C Jam Blues only gets six lines plus a few extra details that talk about the outfit's one and only 7" single. So the layout is varied and interesting.

Talking about 'obscure', Joynson has done an immense amount of work to unearth little known bands and their even rarer works. Some groups only released a lonely single, others are merely known for an unreleased acetate. All are worthy of attention, though.

Joynson himself added "As well as psych and prog acts, artists releasing mainstream rock & pop, beat, R&B, folk, folk-rock, jazz-rock and glam-rock are all covered too. There is just a relatively short list at the end of the book of artists who recorded between 1963 and 1976 who are not included. These are mostly artists whose heyday was in the early sixties but who continued to record after 1963. So the book aims to document almost all UK

artists who recorded between 1963 and 1976 that are likely to be of interest to record collectors".

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The winner will be chosen by a blind draw from the cards received. Multiple entries will be disqualified. Terms and Conditions as per our Competition, see page 31.

free reader Classifieds

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WANTED: AUDIO-
Technica aluminium alloy
S-shaped spare pipe
for AT1100 tonearm
(detachable) Tel: Toni 07971
953628

ION OBELISK 100
amplifier, £100. Roksan
Atessa CD player, £450.
Arcam Solo 5.1 Movie AV
amp, £475. Sony TCK6115
cassette, £55. Technics
SLP770 CD player, remote,
manual, £65. Tel: 01708
457 691

SME 3009 Series 2
improved fixed headshell,
leads, no box. £175. Tel:
01708 457 691

DYNEVECTOR P-75
MkII MM/MC phonostage.
Excellent condition, £200
ono. Supra Mains Surge
Conditioner, 6 way block,
£40, with Supra 10-rad, 1
metre cable, £60 ono. Tel:
Mick 07515 128 910

PIONEER A400 amplifier,
£150. Cambridge Azur
640C CD player, £100
with remote. Cambridge
P40 Mk2 amplifier, phono
connections, Stan Curtis
design, excellent, £100.
Spendor BCI active
monitor loudspeakers,
£250. Tel: 01704 530 928

WANTED: CYRUS mono
amps X or 200. AVI
Neutrons, cherry, mint,
boxed, £285. Audiolab 8200
CDQ, mint, boxed, £650.
Tel: Phil 07973 426 291
(Birmingham)

WHARFEDALE 220
speakers, brand new,
boxed etc, plus RS300
stands, bargain £165. Great
starter/student kit! Mission
751's, perfect working
order, £65. Demo no
problem. Prefer collection.
Wirral/Liverpool area. Tel:
0751 350 8898

ARCAM A85 integrated
amplifier and Arcam CD82
player. Owned from new.
Both mint condition.
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both. Demonstration with
pleasure, £525 ono. Buyer
to collect. Tel: 01922 628
179

QUAD 34 pre-amp, 306
amp, FMH tuner in Quad
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£350. Tel: 01902 735 852
(Wolverhampton area)

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dedicated power supply
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without any Fatigue, simply
wonderful. New £2050
totally mint £1000 Pictures
on request. Email:
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Meridian, Audio Research
etc, fast, friendly response
and willing to travel/pay
cash Please call me on
0781 5892458 or Email :
hififorcash@gmail.com

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Jelco SA750D/Shelter
501Mk2/Timestep PSU/
Sound Hifi upgraded MatI
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condition, Stylus 500 hrs
approx. Well reviewed, can
be collected from GL56.
Looks amazing, sounds
superb!! Looking for £799
ono. T:07894836653
davidprior@email.com

DEVIALET 400 dual mono
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very little use. Boxed, all
accessories, latest software,
superb sound. Priced to
sell at 5495.00 (including
delivery) ovno. Pictures
available on request.
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neilpage37@yahoo.com or
call 00974 66312709 for
more information.

INTERCONNECTS.
CABLE Talk Reference 2,
DNM Reson solid core.
Both 1m pairs, both £30.
Email: jonathan.kempster@gmail.com

OLIVE OPUS HD4 2
TB (Black) for sale. Very
good condition - £900.00
ovno. Reason for sale as
upgrading. Call Keith on
07905 312191.

ARE YOU looking for:
A marked absence of
background noise?
Clarity? Value for money?
Brushed aluminum and
black? Pristine condition,
one owner from new
and with original boxes?
Then please consider the
following items (will split):
Musical Fidelity A308cr
Dual Mono preamplifier
£590. A308cr 24 Bit
Upsampling CD player
£490. A3.2 RDS tuner
£290 Mike (Cheshire)
imeldayates@hotmail.com
07500804700

2 x 6 METRE LENGTHS of
Naim Nac 4 speaker cable
fully terminated. Colour
white perfect condition.
Pictures on request.
£70 no offers. Contact
stemar2@me.com

MYTEK STEREO192-
DSD DAC/pre Black
£650. Musical Fidelity A3.2
CD player £300. Yulong
A100 Class A Headphone
amp £150. All mint email
andy.aldridge@gmx.com
(Cumbria).

PAIR CHARTWELL
Monitor speakers LS3/5A
serial nos 4143 and
4144. Owned since
new. Excellent condition.
Wall mounting brackets.
Pictures available. Offers
over £2,000.00. Tel 023
92464195 Email: walsmsleyhi@waitrose.com

QUAD 909 power amp
£460 good condition but
buyer to hear and collect,
Proac Tablette Reference
Eight speakers, Black Ash,
boxed as new £650 Russ
Andrews 3mtr KS1010
interconnects £725 Sonus
Faber Concertino speakers
with Sonus Faber Piano
Black fluted stands in
excellent condition, with
original boxes £650, Pr
3mtr bespoke Silver High
Breed Quintessence
speaker cables, banana
terminations, £75, Arcam
DVI 137 DVD Player
excellent condition £200
Tel Coventry 02476
679165 or 079 6876
9595 Email: woodfine@hotmail.co.uk

TELLURIUM Q critically
acclaimed Graphite speaker
pair two metres banana
plugs in superb condition
(RRP £1850.00) selling for
£850.00 including postage.
Tel: 01303 863424 or
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MARTIN LOGAN Montis,
ELS with 200w active
woofer in dark cherry
finish. Perfect condition,
boxed up, very little use
(60 hours and 9 months
old) superb sound quality.
Priced to sell £5995.00
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ovno. Pictures available
on request. Contact
neilpage37@yahoo.com
or call 00974 66312709 for
more information.

WANTED FAULTY or non
working Quad 44 preamp
later grey model. Contact
Mike 01758 613790.

WANTED: AUDIO-
Technica aluminium alloy
S-shaped spare pipe
for AT1100 tonearm
(detachable) Tel: Toni 07971
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DAMSON HEADBONES £100

Earphones by their very nature go in your ears – don't they? Well, not necessarily. Sound can also be transmitted to the inner ear via your cranial bones – which is the thinking behind Damson Audio's new Headbones headset.

Instead of inserting tips into your ear canal the Headbones use pads which sit just below your

temples and transmit the sound to the brain via bone conduction.

If that sounds slightly bizarre, it's not as off-the-wall as you may think. It's well known that bones conduct lower frequencies better than air – the very reason your voice sounds deeper to yourself than it does when you hear a recording of it.

So that's the thinking behind the Headbones. They're a wireless headset employing apt-X Bluetooth that sits around your head. The sound-producing pads rest on the top of your jaw bone while the headband incorporates a track skip control and mini-USB charging port.

Although the headband looks rather large at first it weighs just 80g and once positioned is extremely

light and comfortable to wear.

At first listening to music on the go without having anything actually in your ears proved a strange experience. But you quickly get used to it and on the whole the sound quality is rather decent.

Bass, especially, seems to have a rather warm and deep quality which imbues whatever you play with a rich quality. Treble, unfortunately, does seem rather curtailed, however, and not up to the standard of normal in-ear headphones.

In terms of absolute sound quality the Headbones may leave a little bit to be desired. But don't write them off as a mere gimmick. It's an interesting technology which could well make some significant strides in the future.

And in terms of convenience and ease of use they do have a lot going for them. **JM**

Damson Audio
[www.damsonaudio.co.uk]

SOUNDBITES



ATACAMA BLUE EAGLE £139

Isolating hi-fi components from mechanical and electrical vibrations is a tried and trusted way of improving their performance. Microphonic disturbances from internal electronic components or the outside environment can have a deleterious effect on the small electric currents within components and lead to a smearing of sound.

So if you are looking to squeeze the last ounce of performance out of your equipment the better isolation

you can provide the better.

But it's worth bearing in mind that the differences can be subtle and vary between different kinds and even makes of components.

Which is just what I found with the Atacama Blue Eagle supports. Priced at £139.99 for a set of four, they consist of adjustable solid brass cones with a matching round cup and are fitted with a foam material to sonically dampen and protect the outer case of hi-fi components.

They are easy to fit while sturdy and solid enough to support even the

heaviest of components.

Placed under an Oppo BDP-105D universal disc player they brought a tauter, more focussed sound – with a cleaner treble and firmer bass, without upsetting the essentially smooth balance of the player. However, using them with a Naim NDX didn't bring any obvious improvements at all.

Interestingly, the Blue Eagles paid real dividends underneath small loudspeakers placed on bookshelves or tables. On a pair of already excellent Spendor D1 loudspeakers they imbued them with more low-end energy and a noticeably cleaner top end. Stringed instruments in particular had more snap with better definition. It's not a night-and-day difference but noticeable.

In conclusion, the Atacama Blue Eagles can be effective in eking out some extra performance from your system and are worth investigating. **JM**

Atacama
[www.autocama-audio.co.uk]

NEXT MONTH NOVEMBER 2015 ISSUE

TANNOY REVOLUTION XT 6F LOUDSPEAKERS

The Revolution XT 6F is the most affordable Tannoy floorstander to feature the company's renowned dual-concentric driver. This, allied to a 6" bass driver and a cabinet incorporating an integrated plinth and downward-firing reflex port, promises a big, dynamic sound from a relatively compact enclosure - and all for just £1000.

We've will be putting a pair through their paces - so don't miss next month's Hi-Fi World to find out how they fared.

Also, we hope to bring you —

XTZ M2 SPEAKERS

ROKSAN PUG TONEARM

KEF M400 HEADPHONES

ASTELL & KERN JR DIGITAL MUSIC PLAYER

ROGUE AUDIO PHAROAH SILVER VALVE AMP

ECLIPSE TD-M1 WIRELESS LOUDSPEAKER SYSTEM

QUEEN: THE STUDIO COLLECTION -

- 180GM VINYL BOX SET

RASPBERRY PI 2 MODEL B 1GB/

CIRRUS LOGIC AUDIO CARD

BENCHMARK SMS1 SPEAKERS/

BENCHMARK AHB2 POWER AMP

...and much more.

This is a selection of what we hope to bring you, not a complete list. We

regret that due to a wide range of issues, such as failure under review, we cannot guarantee that all products listed above will appear.

PICK UP THE NOVEMBER 2014 ISSUE OF HI-FI WORLD ON SALE SEPTEMBER 30TH 2015, OR SUBSCRIBE AND GET IT DELIVERED TO YOUR DOOR: SEE PAGE 20

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or write or type your advertisement copy in block capitals with one word per box and post it to us at:

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FREE READER CLASSIFIED ADVERTS COPY DEADLINES

NOVEMBER 2015 - 7TH SEPTEMBER

DECEMBER 2015 - 5TH OCTOBER

MARIA MULDAUR

MARIA MULDAUR

EXHIBIT



"The album stands on its own two feet as a work of sweetness but also veers off into some decidedly bawdy tones"

Even if you didn't know at the time of the release of this album in 1973 who Muldaur was, if you flipped the LP over and just glanced at the twelve names and faces who supported her on this album, you couldn't help but be impressed.

Let me give you a few of those. We have: Mac Rebennack or, as he is best known, Dr John. A formidable boogie and blues pianist with a lovable growl of a voice; there's Ry Cooder, an excellent musician and guitar-toting genius who brought the Buena Vista Social Club to wider notice; Clarence White, a gifted guitarist and folk-rock pioneer who was part of The Byrds; David Grisman a bluegrass specialist, Grateful Dead and Jerry Garcia collaborator; Jim Keltner was most associated with the solo works of John Lennon while the rest of the guys were highly-respected and very experience session men.

Muldaur couldn't fail. Well, she could, of course. She could have receded into the background and become a non-entity and allowed her backing musicians to take the centre stage – but that didn't happen.

Even at her tender age Muldaur was a bit of a veteran, having had lots of experience in the Even Dozen Jug Band set up by John Sebastian and David Grisman, and then a time in the Kweskin Band where she met, married and divorced Geoff Muldaur.

Geoff was not only her life partner but also her musical partner so the solo status was scary and rather alien for her.

The thing about the album and the men on it was that they served as Muldaur's support system in terms of both friendship and her musical career.

One of which was guitarist David Nichtern.

Muldaur recalls, "...when I first separated from Geoffrey, he was very encouraging and told me, 'You can do this.' I was just sobbing and I was a mess".

"We had a little talk and he would say, 'Look, people still know you from the Jug Band and if I can get work in these little coffee houses, you can, too.' And so we put together a few tunes and he got us some gigs".

"This was real low profile stuff. I'd be

crying all the way up to the gig and he'd say, 'Okay, dry your eyes and wash your face. We're on in half an hour.' And he was just a very supportive little brother to me".

The album was not only well received it produced a single. And what a single! "Yes, it happened to have a little hit called 'Midnight At The You-Know-What' on it".

She's talking about 'Midnight at the Oasis', of course. This was her first big hit which is still seen as 'the' Muldaur song and is popular, even now with so many people.

"With everybody – it's amazing. It's so weird to me" she said. "Not a gig goes by that several people don't come up and tell me exactly where they were when they first heard that. I guess, a happy memory for a lot of people. People tell me they lost their virginity to that song, they got proposed to, they conceived babies – it was a huge hit all over the world. It was God's way of blessing me, and I'm grateful to that song every day, because it was totally unexpected. That was just the song that happened to click with everybody. So, thank you, God".

Of course, the album is more than just a megahit, it stands on its own two feet as a work of sweetness but it also veers off into some decidedly bawdy tones before touching on the poignant and, with Kate & Anna McGarrigle's Work Song, the positively stirring.

Such is the strength of the tracks on this LP. It's an interesting album too because Muldaur would later move towards more jazz and gospel-infused works but this release rests upon country and blues.

This edition has been released by Exhibit (www.exhibitrecords.com), pressed on 200gm vinyl, released in a thick gatefold sleeve and mastered by Kevin Gray at Cohearent. Quality all the way. Run by ex-Audio Fidelity man Ernie Campagna, Exhibit's re-release is an excellent edition with a well balanced, open sound.

You can hear other releases on the label including Trini Lopez' 'At PJ's' (1963), Lester Flatt & Earl Scruggs' 'Foggy Mountain Jamboree' (1957), The Manhattan Transfer's 'Vocalese' (1985), Johnny Cash's 'Orange Blossom Special' (1965) plus Chet Atkins & Les Paul's 'Chet & Lester' (1976) **PR**



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"The reality is the Krell manages to make good sounding recordings sound very good indeed" - Alan Sircom, hi-fi+, March 2015

EVERY LITTLE THING IT PLAYS IS MAGIC



VANGUARD IS A BOLD MUSICAL STATEMENT.

The Vanguard, joining the ranks of the Krell line of amplification, is the advanced component destined to bridge the worlds of traditional high-end audio and digital media.

For devotees of the brand, as well as newcomers to the best of music playback in the home, the Vanguard is a powerhouse able to deliver authentic, natural sound with grace and command.

Vanguard incorporates a 200-watt-per channel amplifier and a Class A preamplifier in a compact chassis that borrows its design and construction

from the Krell Foundation preamp/processor. High-quality WBT speaker cable terminals provide secure connections. Vanguard will drive any speakers to which it is connected.

Analogue inputs include three stereo and one stereo balanced. Crucially, Vanguard can accept sources fed by an optional digital module with USB, HDMI, coaxial and optical inputs, Ethernet for system integration, controlled through dedicated iOS and Android apps, as well as wireless apt-X Bluetooth streaming.

The Vanguard is both bold and musical, the statement is up to you.



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